

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 83 Reade Street, New York. Entered at the Post Office, New York, as Second-Class Matter.

Vol. XXVIII: No. 14.

New York, Thursday, October 6, 1881.

\$2.50 a Year, Including Postage.
Single Copies, Ten Cents.

Nabholz's Riveting Machine.

Boilers and boiler work are at the present moment receiving a great deal of attention, and anything which promises to improve the quality of the work or reduce the expense of it is of the greatest interest. The machine which we illustrate differs from most of those constructed for the purpose in that it is driven by power, the pressure upon the rivet being obtained by a worm wheel working in a toothed section. It was

vents the maximum length of stroke being exceeded.

Altogether, the machine is one that appears promising, though we cannot see that it will be any lighter or cheaper to build than an ordinary steam riveter. The motion of the ram, being given by means of a worm, may have some advantages over that of the hydraulic or steam machine, but that is a matter to be demonstrated by actual trial. In working, it will be necessary to maintain the clutch in good

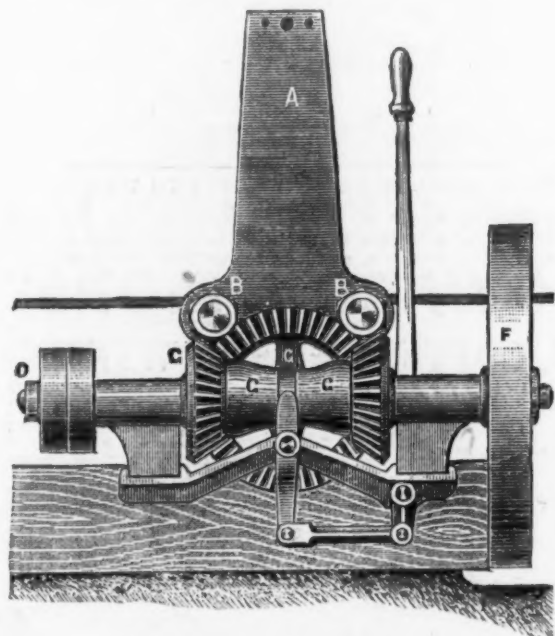
considering the sedan chair a sufficiently rapid and luxurious means of locomotion. But the ministers who had to prepare for war were greatly hindered by the complete absence of suitable means of transport for troops and stores, and the people in the palace are beginning to see that the great empire without railways and telegraphs is in reality defenseless. Preparations are now being made to provide both most extensively. About a year ago, the Emperor or his counselors gave their sanction for a

gone to St. Louis, where he will immediately assume charge of the entire manufacturing operations of the Vulcan Steel Company, of that city, for a definite period.

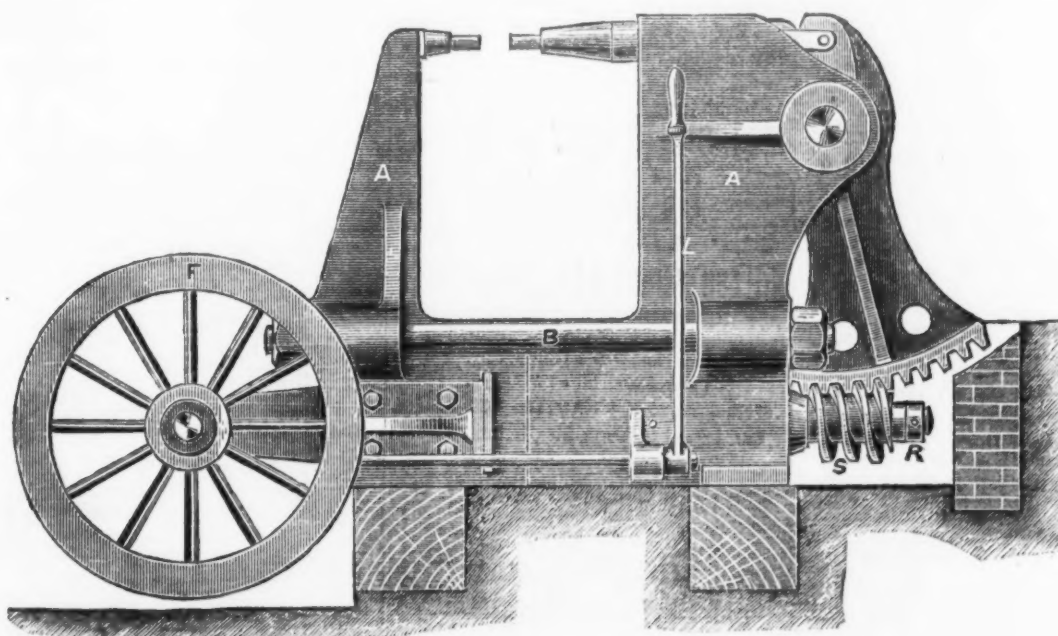
Ancient Door Furniture.

We illustrate a number of interesting specimens of old ironwork, taken from doors of the sixteenth and early seventeenth centuries. In Fig. 1 is shown one of a pair of

shown in Fig. 3. This was formed with a bolt which works within the front plate, and, when pushed into the staple, catches over a notch in the inside of the lock, and is held in its place by a spring, the key being required to lower the notch in order to open the lock. The front of the lock is designed in three upright panels of Flamboyant tracery, the keyhole being in the center, with two small buttresses between; a plain rim surrounds the whole as a border. The tracery of the front is made up in pierced



End View.



Side View.

NABHOLZ'S RIVETING MACHINE.

built by Messrs. Wilson Bros., of Darlington, England.

As will be seen from the engravings, the machine consists of a main frame A, tied together at bottom with bolts B B. The main driving shaft O receives its motion from a belt; on this shaft is keyed a heavy fly-wheel, F, and a double friction clutch, C C; the latter is thrown in and out of gear by means of a lever, L, with connections to clutch. As soon as the lever L is moved toward the machine, the large bevel

order, so that the maximum pressure the framing will stand is not exceeded. The machine is arranged to serve as a bar straightening press and horizontal punch.

Engineering says that it will close up from 1200 to 1500 rivets in 9½ hours, when served by two laborers and two boys, and worked in connection with a specially constructed furnace and overhead traveling crane, which accessories are supplied by the makers. This machine is also provided with

telegraph between Peking, Tientsin and Shanghai, which will probably be completed this year, and but little doubt exists that all the great cities of the empire will shortly be united by telegraph. Imperial permission has also been obtained for a railway from the capital to the port of Tientsin, a distance of 70 miles, and from there to the River Yangtszekiang, 500 miles farther south. The imperial exchequer is not at present in a state to defray the expense of such extensive undertakings, but foreign capital may be

cupboard doors of carved oak, probably Flemish in workmanship. Each door has a sunk panel with a semicircular head and small spandrels of foliage; within the panel is a circular border inclosing the monograms, *ih*s and *ma*; above the circle is a crown formed of three *fleurs de lis*, with Gothic tracery. The outside plate lock has a horizontal bolt, which works outside the front plate through two loops formed by the buttress staples which fasten the lock to the door. The hinges are garnet, of elegant

plates of two thicknesses, so as to give the effect of relief.

It is worthy of note that, in the example shown in Fig. 1, most unusual care has been taken to have the keyhole so arranged that the key drops into its place almost in an automatic manner. If the key strikes the escutcheon in any portion of the principal part and is then carried downward, it will slide into the keyhole without any guidance from the hand. We call attention to this, because it was one of the characteristic fea-

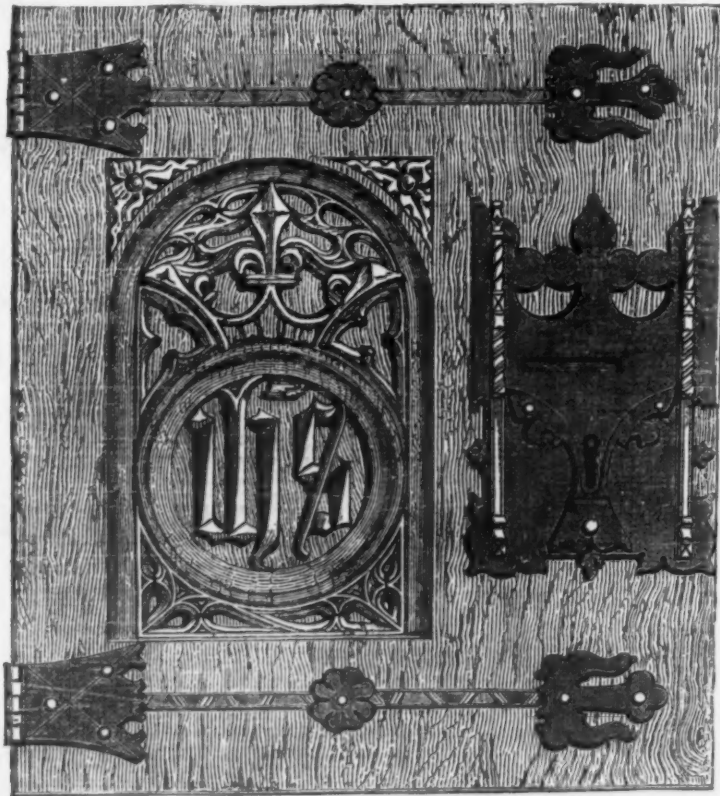


Fig. 1.—One of a Pair of Cupboard Doors of Carved Oak, Fitted with Plate, Lock and Hinges.

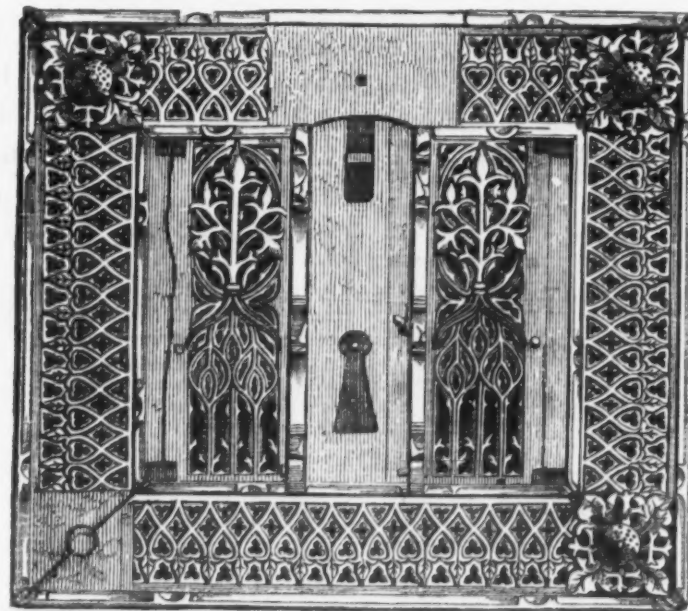


Fig. 2.—An Outside Plate Lock, Locking Certain Portions of the Casing.

ANCIENT DOOR FURNITURE.

wheel G receives motion, as well as the shaft R, with worm S, thus causing the ram P to move forward. This ram has a stroke of 6 inches, but the man at the lever can regulate the stroke according to work. As will be seen, the ram has the same power at every part of its stroke, thus enabling the machine to take any thickness of work without alteration. Girders with their stiffeners bolted on can pass without any risk of being caught by the ram. Another advantage of the machine is that the man at the lever feels the pressure on the rivet, which is about 15 tons, and sufficient to close rivets up to 1 inch diameter. The lever L is connected to a self-acting safety apparatus, which pre-

an apparatus for riveting flanges of girders or channels down to 5 inches of depth. From the latter remark we suppose the machine may be more valuable in architectural and bridge work than for any other purposes.

China will in all probability unexpectedly derive advantage from her recent specter of a Russian invasion. The palace authorities have hitherto been strongly opposed to the construction of railways within the frontiers of the empire. It is not very long ago that the Chinese government bought up and silently removed a railway constructed and worked by foreign capitalists,

had to any extent if only sufficient guarantees are given to investors that the railways will be constructed and worked in the way desired by them. The whole movement is of the greatest significance, as a proof that the Chinese are beginning to see that Confucius is somewhat antiquated, and that they must somehow or other adopt and work modern ideas if their empire is not to tumble to pieces.

Mr. John E. Fry, former superintendent of the Steel Department of the Cambria Iron Works, whose recent resignation of that position has already been noted, has

and slender design; in the center of each is a rose-like figure, and the ends are worked with Gothic forms.

An outside plate lock is also shown in Fig. 2. In the center are three compartments, the middle one being for the keyhole; those on the sides are covered with Flamboyant tracery, having crocketed canopies above; the cover plate to the keyhole, of which only the rivets remain, probably matched these. A border of rich tracery surrounds the whole. The heads of the four corner rivets, which hold the perforated plates to the back, are eight-leaved flowers, in two thicknesses.

A third lock of the outside plate type is

tures of all the older locks which have come to our attention. Occasionally the keyhole is placed at the bottom of a large depression. It is never in this old work put at the top of a boss, as is very common at the present day. In Fig. 1 the metal work is made most effectually to strengthen the wood, while the carvings are used in a subordinate position. Of the three examples this one strikes us as being the finer, though by no means as elaborate as the other two, which seem more like carved work than wrought iron. It has been a question in the minds of some who have examined old work of this character, whether portions were not actually made of a malleable cast iron which,

Metals.
ANSONIA
BRASS & COPPER CO.,
 No. 19 CHURCH Street,
 Phelps Building, NEW YORK.

BRASS AND COPPER

Sheets, Bolts, Rods, Wire, &c.
Seamless Brass & Copper
Tubing.

Ansonia Corrugated Stove Platforms.
PURE COPPER WIRE
 For Electrical Purposes, Bare and Covered.
 Phosphor Bronze Rods for Pumps, &c.

ANSONIA ★ REFINED
INCOT COPPER.

PHELPS, DODGE & CO.

IMPORTERS OF
TIN PLATE,
ROOFING PLATE,
 Sheet Iron, Copper, Pig Tin, Wire,
 Zinc, &c.

MANUFACTURERS OF
COPPER AND BRASS.
 CLIFF STREET, NEW YORK.

SCOVILL MFG CO

BRASS,
 HINGES, WIRE, GERMAN SILVER.
PHOTOGRAPHIC GOODS.

BUTTONS,
 CLOTH AND METAL.

DEPOTS, 419 & 421 Broome St., N. Y.
 177 Devonshire St., Boston.
 183 Lake St., Chicago.

DICKERSON, VAN DUSEN & CO.,

Importers of
 Tin Plate, Pig Tin, Sheet Iron, Copper,
 Wire, Zinc, Etc.
 29 & 37 CHURCH St., cor. Fulton,
 DICKERSON & CO., Liverpool, NEW YORK.

A. C. NORTHROP,
 Waterbury, Conn.,
NOVELTIES IN BRASS AND OTHER METAL GOODS
FOR HARDWARE TRADE.

Wrought Iron and Brass Machine Screws; Turned, Hexagon, Round and Square Head Cap and
 Set Screws; Brass and Iron Safety and Jack Chain; Gilt, Nickel Plated and Bronze Trimmings of all
 kinds, from Sheet Iron, Steel or Brass.
 Estimates on patented articles, or any description of Sheet Metal work, respectfully solicited and
 promptly given.

WORKS
 AT
 TRENTON,
 N. J.

ROEBLING'S

WIRE ROPE

New York Office
 AND
 Warehouse
 117 Liberty Street.

THE JOHN A. ROEBLING'S SONS CO.,

MANUFACTURERS OF

WIRE ROPE

OF
 Iron, Steel and Copper

FOR
 Hoisting Purposes of all
 kinds, for Ferries, Stays,
 Ship Rigging, Sash Cords,
 Lightning Rods, &c., &c.
 Suspension Bridge Cables.

GALVANIZED
 Telegraph Wire,
 Market Wire,
 Vineyard Wire.

Iron and Steel
WIRE

FOR
 Market Wire, Fence Wire
 Bridge Wire, Chain Wire
 Buckle Wire, Spring Wire,
 Rivet Wire, &c., &c.

GALVANIZED WIRE CLOTHES LINES.

BRODERICK & BASCOM,

MANUFACTURERS OF

IRON
WIRE ROPE.

728 N. Main St.,



STEEL
WIRE ROPE.

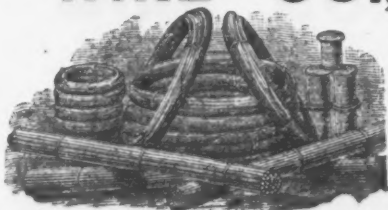
St. Louis, Mo.

WORCESTER WIRE CO.,

Manufacturers of

IRON AND STEEL
WIRE

For all Purposes.
WORCESTER, MASS.



Metals.



Waterbury Brass Co.

CAPITAL. - - \$400,000.

Sheet, Roll and Platers' Brass,
GERMAN SILVER,
 Copper, Brass and German Silver Wire,
BRASS AND COPPER TUBING,
COPPER RIVETS & BURS,
BRASS KETTLES,
Door Rail, Brass Tags,
PERCUSSION CAPS,
POWDER FLASKS.

Metallie Eyelets, Shot Pouches, Tape Measures, &c.
 And small Brass Wares of every Description.
 Cartridge Metal in Sheets or Shells a Specialty.
 Sole Agents for the
 Capewell Mfg. Co.'s Line of Sport-
 ing Goods and Wood's Paper
 Shot Shells.

DEPOTS: 296 Broadway, New York, WATERBURY, Conn.
 189 Eddy St., Providence, R. I.

Detroit Copper & Brass
Rolling Mills.

BRAZERS' AND SHEATHING COPPER,
 ROLLED, SHEET & PLATERS' BRASS
 GERMAN OR NICKEL SILVER,
 Copper Wire for Electrical and other purposes,
 Brass and German Silver Wire,
 Copper Rivets and Burs,
 COPPER BOTTOMS FOR TEA KETTLES AND BOILERS,
 Cor. Larned & Fourth Sts., Detroit, Mich.

ROME IRON WORKS,

Manufacturers of

Brass, Gilding Metal, Cop-
 per and German Silver
 (In Sheets, Rods, Tubing or Wire),
COPPER & BRASS RIVETS
AND BURS.
 Rome, New York.

Metals.

The Plume & Atwood
Mfg. Company,

MANUFACTURERS OF

SHEET and ROLL BRASS and WIRE,

German Silver and Gilding Metal

Copper Rivets and Burs,

Kerosene Burners,
Lamp Trimmings, &c.

18 Murray Street, New York.

13 Federal Street, Boston.

109 Lake Street, Chicago.

Rolling Mill, Factories,
 THOMASTON, CT. WATERBURY, CT.

Bridgeport Brass Co.,

MANUFACTURERS OF

Sheet and Roll Brass,
 Brass & Copper Wire & Tubing,
 German Silver Metal and Wire
 Copper and Iron Rivets.

OILERS and CUSPADORES, LAMPS and TRIMMINGS,
 LANTERNS and TRIMMINGS, KEROSENE BURNERS,
 Clocks & Fly Fan Movements, PLUMBERS' MATERIALS.
 Particular attention paid to cutting out Blanks and
 manufacturing Metal Goods.

MANUFACTORY, WAREHOUSE,
 Bridgeport, Conn. 19 Murray St., N. Y.
 THOS. W. FITCH, Pres. and Treas. A. A. LASAR, Secy



ST. LOUIS, MO.

Holmes, Booth & Haydens,
WATERBURY, CONN.

NEW YORK, BOSTON,
 49 Chambers St. 18 Federal St.

Manufacturers of all kinds of

Brass, Copper & German Silver,

ROLLED AND IN SHEETS.

BRASS & COPPER WIRE,

Tubing, Copper Rivets & Burs.

BRASS & IRON

JACK CHAIN, DOOR RAIL.

German Silver Spoons,

SILVER PLATED FORKS & SPOONS,

Kerosene Burners, &c.

JOHN DAVOL & SONS,

Agents for

Brooklyn Brass & Copper Co.,

Dealers in

Ingot Copper, Spelter, Lead, Tin,
 Antimony, Solder & Old Metals.

100 John Street, New York.

PASSAIC ZINC CO.

Manufacturers of

Pure Spelter

FOR
 Cartridge Brass, Gas Fixtures, Bronzes
 AND ALL FINE WORK.

Also for
 Galvanizers & Brass Founders.

MANNING & SQUIER, Gen'l Agents,

113 Liberty Street, N. Y.

Geo. W. Prentiss & Co.,

HOLYOKE, MASS.,

MANUFACTURERS OF

IRON WIRE.

Bright, Coppered, Annealed and Tin
 Plated. Also GUN SCREW WIRE
 Of all sizes straightened and cut to order.

The Schoenberg Metal Mfg. Co.,

Manufacturers of and Dealers in

SOLDER, TYPE,

Stereotype, Electrotype and Babbitt Metals,
 Importers of Block Tin, Antimony, &c. Refiners of
 Lead, Spelter, &c. Highest price paid for Old Metals
 and all kinds of Dross. 328 and 330 East 20th
 Street, between Avenues A & B, New York.

619 to 623 N. Main St., ST. LOUIS, MO.

Correspondence invited.

Wire, etc.

PHILIP L. MOEN, President & Treasurer. CHARLES F. WASHBURN, Vice President & Secretary.
Washburn & Moen Mfg. Co.
 Established, 1831. Capital, \$1,500,000
 WORCESTER, MASS.
WIRE DRAWERS.
 Patent Galvanizing, Rolling and Tempering.
 MANUFACTURERS OF
IRON, AND IRON AND STEEL WIRE.
 Of Every Description.
 A SPECIALTY MADE OF
GALVANIZED TELEGRAPH WIRE,
GALVANIZED TELEPHONE WIRE,
PATENT STEEL WIRE BALE TIES,
PATENT STEEL BARB FENCING,
AND PUMP CHAIN.
 NEW YORK OFFICE: 21 Cliff St. ST. LOUIS WAREHOUSE: 802 No. Second St. CHICAGO WAREHOUSE: 107 Lake St.

"NATIONAL WIRE AND LANTERN WORKS."
Warehouse, 45 Fulton Street, New York.
 And California Wire Works Co., San Francisco, Cal.
 Manufacture, Nos. 1192, 1195, 1204, 1203, 1205, 1207, 1209 and 1211 De Kalb Avenue, Brooklyn, N. Y.

HOWARD & MORSE,
 MANUFACTURERS OF
BRASS, COPPER & IRON WIRE CLOTH,
 Heavy Rolled Cloth for Malt Kilo Floors. Wire Work, Wire Fence, Rolling
 and Guards. Also, Hand and Railroad Lanterns.



ABRAM S. HEWITT, President. WM. HEWITT, Vice President. JAMES HALL, Treasurer. E. HANSON, Secretary.

THE TRENTON IRON COMPANY,

(INCORPORATED 1847),

TRENTON, N. J. Manufacturers of

IRON and STEEL WIRE

OF ALL GRADES,

BRIGHT, ANNEALED, COPPERED, TINNED AND GALVANIZED;

Iron and Steel Wire Rods;

EXTRA QUALITIES OF BAR IRON AND RODS.

Best Qualities of Gun-Screw and Charcoal Iron Wire;

Crucible, Siemens-Martin and Bessemer Steel Wire.

Wire Straightened and Cut to Lengths.

New York Office, COOPER, HEWITT & CO., 17 Burling Slip,
 Philadelphia Office, JOHN HEWITT, Agent, 21 North Fourth St.

IRON AND STEEL WIRE ROPE

For Hoisting, Running & Standing Ropes, Ferries, &c.

CONSTANTLY KEPT ON HAND.

Address, HAZARD MFG. CO., Wilkesbarrs, Luzerne Co., Pa.

FELTEN & GUILLEAUME,

Carlswerk, near Cologne, Germany.

PATENT CRUCIBLE STEEL WIRE,

For Mining and Flow Ropes, Hawseers and Bridge Cables.

SIEMENS-MARTIN AND BESSEMER STEEL WIRE,

Flussseisen, Swedish and German Charcoal Wire.

GALVANIZED TELEGRAPH WIRE

of Charcoal and Swedish Iron and Steel, also with high conductivity, and in long lengths.

GALVANIZED STEEL WIRE,

For Plain, Barb and Strand Fencing, 3, 4 and 7-ply Strand, Staples, &c. Annealed and Oiled Fencing
 Wire, round and oval.

WIRE ROPE

OF EVERY DESCRIPTION.

TELEGRAPH CABLES.

Contractors to the German and Foreign governments. The oldest house in the branch on the Con-
 tinent. Telegraph Address, CARLSWERK, COLOGNE.

General Agents for U. S. and Canada,

PERKINS & CHOATE, 23 Nassau St., N. Y.

A. LESCHEN & SON,

Manufacturers of

WIRE ROPE

OF EVERY DESCRIPTION.

Correspondence invited.



O. LINDEMANN & CO.,
Manufacturers of all kinds of
Japanned, Brass & Tin Plated
BIRD CAGES.
Catalogues furnished to the trade.
254 Pearl St., NEW YORK.

CARY & MOEN,
Manufacturers of
STEEL WIRE for all purposes and **STEEL SPRINGS** of every description.

Market Steel Wire, Crinoline Wire, tempered and covered.
Also Patent Tempered Steel Furniture Springs, constantly on hand.
934, 936 and 938 West 29th Street, NEW YORK.

LIGHT HOISTING MACHINERY.
New Catalogue Just Issued. Sent Free on Application.

YALE LOCK MFG. CO.
Office and Works, STAMFORD, CONN.
Salesroom—
New York, 53 Chambers Street,
Boston, 36 Pearl Street,
Philadelphia, 507 Market Street,
Chicago, 64 Lake Street.

BROWN & BROTHERS,
81 Chambers St., N. Y. Waterbury, Conn.
Manufacturers of
BRASS, COPPER AND GERMAN SILVER,
In Sheets, Rolls, Rods, Wire, Tubing,
Rivets and Burs, Etc.
ALSO,
Seamless Brass & Copper Tubing.
PATENTED SEAMLESS BRASS AND COPPER
HOUSE BOILERS, warranted to stand 100 lbs.
pressure and guaranteed against vacuum.
PATENTED SPRING TEMPERED SHANK,
SILVER-PLATED, FLAT TABLE WARE, in rich
designs.
GERMAN SILVER SPOONS AND FORKS.

POPE, COLE & Co.
BALTIMORE COPPER WORKS,
No. 57 South Gay St., BALTIMORE, MD.,
Have always on hand and for sale
INGOT COPPER,
Also Cakes, of unequalled purity and toughness.

WROUGHT-IRON BEDSTEADS.
The cheapest and best Beds in the market. Adopted
by the United States Government.

COAL SIEVES & RIDDLES.
Iron, Steel and Brass Wire Cloth, Wrought Iron Fencing
and Ornamental Iron and Wire Work, manufac-
tured by
E. T. BARNUM'S WIRE WORKS,
Detroit, Mich.

G. Gunther,
Manufacturer of
Patented Brass, Silver Plated
and Japanned
BIRD CAGES.
Can be nested for ex-
port shipments.
46 Park Place,
NEW YORK.
Largest variety in patterns and unsurpassed in
low prices. New Illustrated Catalogues and Price
Lists on application.

Schenectady Molding Sand Co.

ALBANY AND SCHENECTADY MOLDING SAND
delivered on cars or boats at low rates. All grades
guaranteed. All orders will receive prompt atten-
tion. Address, **J. G. GREENE, Sec'y.**
22 Wall St., SCHENECTADY, N. Y.
G. S. VERDER, Pres; J. G. GREENE, Sec. and Treas.

The Morris Sash Lock Mfg. Co.,
Manufacturers of

The Morris Sash Lock,
Pat. Combined Sash Lift & Lock,
Pat. Self-Locking Shutter Bar,
And specialties in Builders' Hardware.
214 and 216 ELM STREET CINCINNATI, OHIO, U. S. A.

This Advertisement is Changed Every Week.

GAUTIER STEEL DEPARTMENT
OF THE
CAMBRIA IRON CO.,
PHILIP E. CHAPIN, Gen'l Supt.
STEEL, WIRE and SPRINGS.
JOHNSTOWN, PENN.

N. Y. Store, - - - 81 JOHN ST.
Phila. Store, - 505 COMMERCE ST.

MOULDING SAND.
Albany Sand a Specialty.
FOUNDRY FACINGS,
Shovels, Riddles, Brushes, &c.

WHITEHEAD BROS. **WM. WHITEHEAD, Treas.,**
AMERICAN FACING CO. 517 W. 15th St.,
New York.

FACING **J. A. EMERICK & CO.**
1056 & 1076 Beach Street,
PHILADELPHIA,
MANFRS' FOUNDRY FACINGS,
And Dealers in and shippers of all descriptions
MOLDING SANDS and Foundry Supplies.

Established 1810.
N. & G. TAYLOR CO.,
PHILADELPHIA,
Manufacturers, Importers and Dealers in
ODD AND REGULAR SIZES
TIN AND ROOFING PLATES,
Black and Galvanized Sheet Iron, Metals, Wire, Copper,
Stamped Ware, Registers, &c.

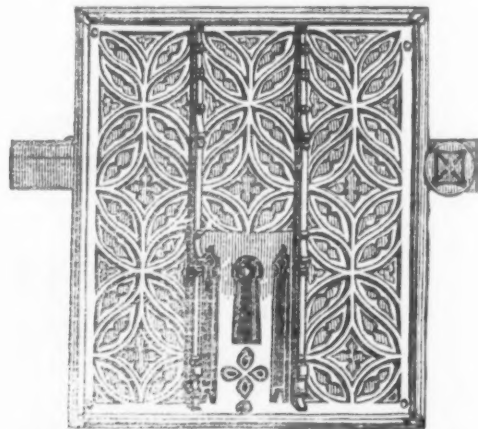
WOOD, JENNISON & CO.,
Manufacturers of SHAFTING, PULLEYS AND HANGERS—A Specialty.
Also, Wood's Patent Bolt Threading Machine. Worcester, Mass.

after being cast approximately to the shape, was drawn under the hammer. Certainly, some of the more wonderful specimens of complicated work would lead one to suppose that this was the case.

How Belts are Made.

The manufacture of leather belts for transmitting power is yearly becoming an industry of greater importance. A visit to one of the large factories gives an insight into the processes by which the rough, oak-tanned hides are transformed into the mechanism of transmission. The hides, as they come in, are nearly as thick as one's hand, rough and stiff. After being weighed, they go into the basement and into a large tank, where they soak for several hours. From the vat they go into a great revolving wheel of wood, 10 feet in diameter and 5 feet wide. The interior of this wheel is lined with cherry, secured with screws, that the stock may not become discolored, and on

however, we regret that we cannot approve. He proposes to remit the passenger duty to every line that gets through the twelve months without any preventable accidents. There are two slight objections to be urged against such a scheme. In the first place, the government would object to cutting off a source of revenue; while in the second, the general public would complain, and not without justice, that the railroad companies were being bribed to do their bounden duty. In point of fact, it is to the interest of every railroad company to have as few accidents as possible, and juries will always be inclined to deal severely with corporations which cannot show that the best care was taken in equipping and conducting their trains. The English companies are behind us in some respects, and are too frequently inclined to treat with contempt the recommendations of the Board of Trade, as, for instance, in the matter of brakes. We may, however, all of us live to see a system of railroad passenger insurance, by virtue of which the company transporting a passenger will be



Ancient Door Furniture.—Fig. 3.—Another Form of Outside Plate Lock.

the inner surface are a multitude of blunt-headed wooden pins. On these the leather continually strikes as the wheel goes round, until it becomes very pliable. This is called the wheeling process. Next the leather goes to the knife man, a very expert operator, who, with a big and very sharp instrument, shaves off the soft or fleshy part from the under side. Thence it goes to the rolling machine, which presses out such water as it has absorbed, and next it is subjected to the scouring machine, a ponderous piece of mechanism resting on stone piers, sunk 5 feet below the basement level, which cleanses it of all dirt. The thick, strong material is now as soft to the touch and flexible almost as glove kid. It has done with the basement, and goes to the fourth floor, where it is put through the remainder of the currying process, such as stuffing and resetting. Then it goes down to the second floor, and to the head currier, who prepares the leather in

bound to pay a certain sum in case of death, and a certain sum in case of injury, the whole settlement being adjusted as quickly and as quietly as a loss by fire or by death in a fire or life insurance company.

Improvements in Planes.

The accompanying illustrations represent improvements in planes brought out by Messrs. C. Kinney & Co., No. 187 Jefferson street, Detroit, Mich. The first represents a plane gauge, which may be used for either squaring or beveling boards. Its construction is such that it can be readily attached to either jack planes or jointers. By the use of the side thumb-screw, shown in the cut, the gauge is fastened down, forming a square. By slackening the thumb-screw, the gauge may be set to any bevel desired. It is fastened in position by the thumb-screw shown at the bottom of the plane. By this arrangement it will be seen that a perfect square, or a bevel of any angle required, may be obtained almost instantly. The second improvement, shown in Fig. 2, is known as Kinney's ripping plane. The manufacturers claim for it that it is the only tool made by which either thick or thin lumber can be ripped by hand with ease and precision. In the heel of the plane a small circular saw is so arranged as to be raised or lowered as the thickness of the lumber requires. As the plane is pushed over the board the saw rotates, which makes it follow a straight line instead of being diverted by the grain of the wood. The construction of the tool is such that it can be adjusted to any width with ease. In ripping thick lumber the tool is to be used on both sides.

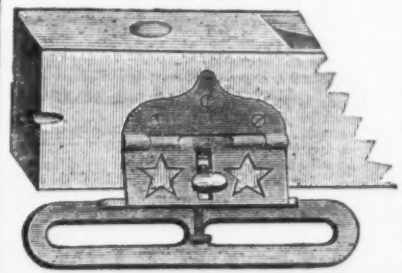


Fig. 1.—Kinney's Plane Gauge.

convenient widths for stretching. Part of this floor is the drying-room, with a false floor of slats, under which are steam pipes, by which the leather is subjected to a high temperature after it has been tightly and smoothly stretched in frames. In this the most careful treatment is requisite, that there may be no stretch to the belt when finished. Next, it is stoned and brushed. The stone, by a curious machine, rubs the strip of leather with very rapid motion; the brush is a cylinder with closely-set bristles, making 3000 revolutions a minute. This operation renders the leather very smooth and glossy. It is now at last ready for the belt maker. It is cut into

Armor Plate Trials in France.—Experiments have recently been made at Givres with armor plates by the three firms—Creusot, Chatillon-Commeny and Terrenoire. Earlier trials had been made with plates of 4 square meters area, but in this case the plates were only 1.2 meters square, the object of this decrease in size being the desire to know if the smallness of the plates had any relation to the cracks usual with large plates. The following results were obtained: Creusot.—Steel plate (hammered). Penetration, 90 millimeters.

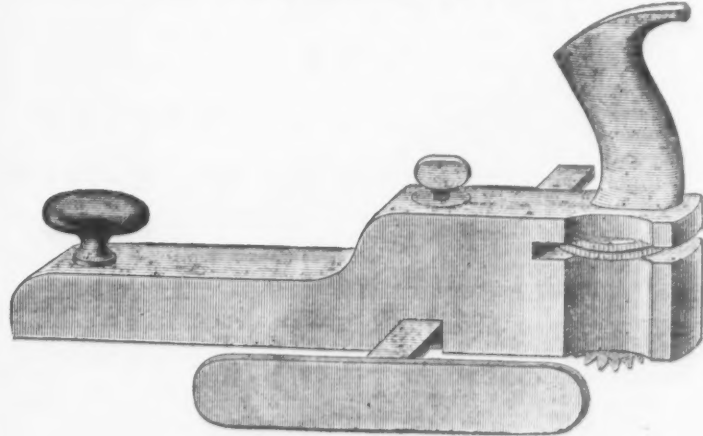


Fig. 2.—Kinney's Ripping Plane.

different widths, and the laps prepared for the presses, by which the ends of the strips are pressed together with a very strong cement made for the purpose. It then goes to the riveting table, where it is riveted and measured, and next to the winding machine, which forms it into rolls and trims the edges. Double belts are formed by cementing and riveting together two thicknesses of leather, prepared in the same manner as for single belts. To thoroughly cement the thicknesses a press of enormous power is used.

A decidedly novel expedient for preventing railway accidents has just been devised by a reflective Englishman, whose scheme,

slight cracks; excellent results. Chatillon-Commeny.—Steel plate. Penetration, 320 millimeters; plate shattered in eight pieces; bad results. Terrenoire.—Compound plate, manufactured without hammering or rolling of the steel, the molten steel being poured upon an iron plate. Penetration, 94 millimeters; cracks slightly more apparent than in the Creusot plate; good results. These results, then, speak greatly in favor of Creusot, although some months ago one of these steel plates behaved so badly that the failure seemed past remedy. At that time a compound plate of Messrs. Ch. Cammell obtained a decided success, which caused its immediate adoption by the marine department. These last trials, however, have put

<p>Iron. NEW YORK.</p> <p>OGDEN & WALLACE, 55, 57, 59 & 91 Elm St., New York. Iron and Steel Of every description kept in stock. Agents for Park Brother & Co.'s BLACK DIAMOND STEEL. All sizes of Cast and Machinery Steel constantly on hand.</p> <p>PIERSON & CO., 24 & 26 Broadway, 77 & 79 New St. NEW YORK CITY. "PICKS" of all kinds, "ESOPUS" HORSE SHOE IRON, BEAMS, ANGLES, Tees, Channels, Sheets, Plates. All descriptions in stock.</p> <p>IRON & STEEL. ABEEL BROTHERS, Established 1764 by ABEEL & BYVANCK, Iron Merchants, 190 South Street and 365 Water, N. Y. ULSTER IRON A full assortment of all sizes constantly on hand. Refined Iron, Horse-Shoe Iron, Common Iron, Band, Hoop and Scroll Iron. Sheet Iron, Norway Nail Rods, Norway Shapes, Cast, Spring and Tire Steel, etc.</p> <p>A. R. WHITNEY, Manufacturer of and Dealer in IRON Our specialty is in Manufacturing Iron Used in the Construction of Fire-Proof Buildings, Bridges, &c. Agent for Carnegie Bros. & Co., Limited, Pittsburgh, Pa., Wrought Iron Beams and Channel Iron. Bay State Iron Co., Boston, Mass., Boiler Plate and Tank Iron. Naylor & Co., Boston, Mass., Homogeneous Steel Plates and Compressed Steel Shafting. Plates Rolled to 100 inches. Plans and estimates furnished, and contracts made for erecting Iron Structures of every description. Books containing cuts of all iron made sent on application by mail. Sample pieces at office. Please address 58 Hudson Street, New York.</p> <p>BORDEN & LOVELL, Commission Merchants 70 & 71 West St., New York. Agents for the sale of Fall River Iron Co.'s Nails, Bands, Hoops & Rods. AND Borden Mining Company's Cumberland Coals.</p> <p>WILLIAM H. WALLACE & CO., IRON MERCHANTS Cor. Albany & Washington Sts. NEW YORK CITY. M. H. WALLACE. W. H. REFRAM.</p> <p>B. F. JUDSON, Importer of and Dealer in SCOTCH AND AMERICAN Pig Iron, Wrought & Cast Scrap Iron, OLD METALS. 457 & 459 Water St., 233 & 235 South St., NEW YORK.</p> <p>DANIEL F. COONEY, (Late of and successor to Jas. H. Holdane & Co.) 88 Washington St., N. Y. BOILER PLATES & SHEET IRON, LAP-WELDED BOILER PLATES, Boiler Rivets, Angle & T Iron, Cut Nails & Spikes. Agency for Glasgow Iron Co., Jos. L. Bailey & Co., Pine Iron Works, Lebanon Rolling Mills, Chester Pipe and Tube Co., Albany & Reus. Iron & Steel Co.'s celebrated Boiler Rivets; Homogeneous Steel, Boiler and Fire Box Plates.</p> <p>S. CHENEY & SON Manlius, N. Y., Small Gray Iron Castings. We warrant our work for smoothness and finish.</p> <p>Powerville Rolling Mill, Manufacturer of HORSE SHOE IRON JOHN LEONARD, 450 West St., N. Y.</p>	<p>Iron. NEW YORK.</p> <p>A. B. Warner & Son, IRON MERCHANTS, 28 & 29 West and 52 Washington Sts. BOILER PLATE, Boiler Tubes, Angle, Tee & Girder Iron Boiler and Tank Rivets. Sole Agents for the celebrated "Eureka," Pennocks "Wawasset," Lukens, brands of Iron. Also all descriptions of Plate, Sheet, and Gasometer Iron. Special attention to Locomotive iron. Fire Box Iron a specialty.</p> <p>ROME MERCHANT IRON MILLS, ROME, N. Y., Manufacturers of the best grade of Bar Iron, Bands and Fine Hoops. Serrils, Ovals, Half Ovals, Half Rounds, Hexagon and Horse Shoe Iron. Also from Charcoal Pig a superior quality of Iron branded J. G. All puddled balls re- duced by hammer. Orders may be sent to the Mill or to J. O. CARPENTER, our Agent, at 59 John Street, New York.</p> <p>Several Choice Lots No. 1 SCRAP IRON, In Yard, New York, FOR SALE BY FOX & DRUMMOND, 68 Wall Street, NEW YORK.</p> <p>MARSHALL LEFFERTS & CO., 90 Beekman St., New York City, MANUFACTURER AND DEALER. Galvanized Sheet Iron, 1st and 2d Qualities. Galvanized Wire, Telegraph and Fence; Galvanized Hoop and Band Iron, Galvanized Rod and Bar Iron, Galvanized Nails, Galvanized Chain, Galvanized Iron Pipe. CORRUGATED SHEET IRON For Roofing, &c., Galvanized, Plain or Painted. Best Charcoal, Best Refined and Common SHEET IRON. Plate and Tank Iron, C No. 1, C H No. 1, C H No. 1 Flange, Best Flange Best Flange Fire Box, Circles. BOILER IRON Stamped and Guaranteed. All descriptions of Iron Work Galvanized or Tinned to order. Price list and quotations sent upon application.</p> <p>JAMES WILLIAMSON & CO., SCOTCH AND AMERICAN PIG IRON, No. 69 Wall St., New York.</p> <p>ULSTER IRON WORKS. 90 Broadway, New York. Tuckerman, Mulligan & Co CARMICHAEL & EMMENS 130, 132 & 134 Cedar St., New York. DEALERS IN IRON AND STEEL BOILER PLATE. Lap-Welded Boiler Tubes, &c., &c. Agent for Otis' celebrated Cast Steel Boiler Plates, The Coatesville Iron Co., Pottstown Iron Co., The Laurel Rolling Mills, and Union Tube Works; Wrought Iron Beams, Angles, Tees, Rivets, &c.</p> <p>HUGH W. ADAMS & CO., IMPORTERS OF SCOTCH AND ENGLISH IRONS, Agents for American Charcoal and Anthracite Furnaces, 56 Pine Street, New York. HUGH W. ADAMS. DANIEL L. CORR.</p> <p>FOR SALE. TWO UNMUT ROLLS FOR A 16-INCH MILL. ABOUT 10 TONS 1 1/2-IN. SQUARE BAR IRON. ABOUT 4 TONS 1 1/2-IN. SQUARE BAR IRON. ABOUT 7 TONS 1 1/2-IN. SQUARE BAR IRON. Also, a small lot of other sizes, by DANIEL W. RICHARDS & CO., 92 Mangin St., N. Y.</p> <p>PASSAIC ROLLING MILL CO., Manufacture and have always in stock ROLLED IRON BEAMS, Channels, Angles, Tees, Merchant Bars, Riveted Work, For- ging, Eye Bars, &c. PATERSON, N. J. Room 45, Astor House, New York.</p> <p>CUT NAILS Hot Pressed Nuts, Bolts, Washers, &c. FULLER BROTHERS & CO., 139 Greenwich Street, New York.</p>	<p>Iron. NEW YORK.</p> <p>JOHN W. QUINCY & CO., 98 William Street, New York. Anthracite & Charcoal Pig Irons, Wrought Scrap, Cut Nails, Copper, BLOCK TIN, LEAD, SPELTER, ANTIMONY, NICKEL, &c. HARRISON & GILLOON IRON AND METAL DEALERS, 558, 560, 562 WATER ST., and 302, 304, 306 CHERRY ST., NEW YORK. have on hand, and offer for sale, the following: Scotch and American Pig Iron, Wrought, Cast and Machinery Scrap Iron, Car Wheels, Axles and Heavy Wrought Iron; also old Copper, Composites, Brass, Lead, Pewter, Zinc, &c.</p> <p>OXFORD IRON CO., (B. G. CLARKE, Receiver.) Cut Nails AND SPIKES. J. S. SCRANTON, Sales Agent, 81, 83 and 85 Washington Street, NEW YORK.</p> <p>BURDEN'S HORSE SHOES. "Burden Best" Iron Boiler Rivets. The Burden Iron Company Troy, N. Y.</p> <p>EGLESTON BROS. & CO., 166 South Street, NEW YORK CITY. 267 Front Street, BURDEN'S H. B. & S. AND ULSTER BAR IRON. All sizes and shapes in stock. Also Best Grades of Am. & Eng. Ref'd Iron, Common Iron, &c Glengarnock and Carnbroe SCOTCH PIG IRON. For spot delivery and for prompt or forward shipments to New York, Boston, Philadelphia, Baltimore or New Orleans. For sale in lots to suit by JAMES LEE & CO., Sole Agents for the United States, 72 Pine Street, New York. DESPARD BROTHERS, 60 Wall St., New York. P. O. Box 764. Importers of New and Old Rails, Steel Blooms, SCRAP IRON, &c. Duty paid or in bond.</p>	<p>Iron. PITTSBURGH.</p> <p>W. D. WOOD & CO.'S  PATENT Planished Sheet Iron. Patented March 14th, 1865; April 8th, 1873; Sept. 9th, 1873; Oct. 6th, 1874; Jan. 11, 1876. Guaranteed fully equal in all respects to the IMPORTED RUSSIA IRON, and at a much less price. FOR SALE, by all the principal METAL DEALERS In the Large cities throughout THE UNITED STATES. And at their Office, 111 Water Street, PITTSBURGH, PA.</p> <p>C. KANE, OLD RAILS, SCRAP IRON, STEEL, PIG IRON, BLOOMS, AND ORE. PITTSBURGH, PA.</p> <p>WM. REA, Presd. SAM. BAILEY, Jr., Secy. F. B. LAUGHLIN, Vice-Presd. W. A. SHAW, Treas. UNION STORAGE CO. RECEIVE ON Storage and Issue Warrants ON PIG IRON, BLOOMS, INGOTS, MUCK BAR, RAILS, &c. Correspondence relative to establishment of yards at furnaces solicited. General Office, PITTSBURGH, PA.</p>	<p>Iron. PITTSBURGH.</p> <p> SNOW SHOES ROADSTER PATTERN.</p> <p>STEEL TOE CALKS. Extra Quality Homogeneous Steel BOILER PLATE STEEL PLATES, all descriptions. Cut Nails and Spikes, Plate and Sheet Iron, all descriptions. SHOENBERGER & CO., Pittsburgh, Pa. KEYSTONE ROLLING MILL, Limited, Manufacturers of IRON, Pittsburgh, - - - Pa. Bonnell, Botsford & Co., Iron, Nails & Spikes. YOUNGSTOWN, OHIO. MARSHALL IRON CO., Manufacturers of Best Charcoal Bloom, Best Refined & Common SHEET IRON. Office and Mills, Newport, Delaware.</p> <p>Sable Iron and Nail Works. ZUG & CO., Manufacturers of the Celebrated Sable Nails Office and Works, PITTSBURGH, PA.</p> <p>LEECHBURG IRON WORKS. KIRKPATRICK & CO., Manufacturers of all grades of FINE SHEET IRONS, (Refined, Cold Rolled, Show Card, Stamping, Tea Tray, Polished, Shovel, Ferrule Iron, &c.) NATURAL GAS USED AS FUEL. OFFICE, No. 143 First Ave., Pittsburgh, Pa. WORKS, Leechburg, Pa.</p> <p>W. S. MIDDLETON, Broker in Machinery & Iron Agent for FORSTER'S CRUSHER & PULVERIZER, The best in market. W. S. MIDDLETON, 52 John St., N. Y.</p> <p>S. A. LISSBERGER, IRON & METAL DEALER, 509, 511 and 513 to 519 East 19th St., New York, have on hand, and offer for sale, the following: Scotch and American Pig Iron, Wrought, Cast and Machinery Scrap Iron, Car Wheels, Axles and Heavy Wrought Iron; also, old Copper, Composition, Brass, Lead, Pewter, Zinc, &c.</p> <p>WIRE RODS. BUYERS OF ENGLISH IRON AND STEEL RODS are invited to communicate with the undersigned, manufacturers' agents. A. C. LESLIE & CO., Montreal.</p> <p>Agency of N. M. HÖGLUND'S SONS & CO., Stockholm. Swedish & Norway Iron of every description. Stock on hand at Boston, New York and Philadelphia. Importation orders & specialty. GUSTAF LUNDBERG, 38 Kilby St., Boston. ALBERT POTTS, Philadelphia Agent, 234 & 236 N. Front Street.</p> <p>CHARLES HUBBARD, "Sheridan" & "Leesport" Brands Pig Iron, WHITE IRON (Anthracite & Bessemer) Stock for making strong castings. "CHARCOAL PIG IRON," "Maiden Creek" and "Garlick" brands. Favorite brands of Scotch Pig Iron, In stock and to arrive. OLD CAR WHEELS, BEST BRANDS. 46 Cliff St., New York City.</p>
--	--	---	--	---

Iron.
PHILADELPHIA.
**Siemens' Regenerative
GAS FURNACE.**
RICHMOND & POTTS,
119 S. Fourth St., PHILADELPHIA, PA.

The Cambria Iron and Steel Works,
Having enjoyed for over TWENTY-FIVE YEARS the reputation of producing the best quality of
RAILS,
have now an annual capacity of
150,000 Tons of Iron and Steel Rails, Splice Bars, &c.
ADDRESS,
CAMBRIA IRON COMPANY,
No. 218 South 4th Street, Philadelphia.
Or at the Works, JOHNSTOWN, PA.
Or LENOX SMITH, New York Selling Agent, 46 Pine St., N. Y.

THE PHOENIX IRON CO.,
410 Walnut Street, PHILADELPHIA.
Manufacturers of Wrought Iron
Beams, Deck Beams, Channels, Angle & Tee Bars,
STRAIGHT AND CURVED TO TEMPLATE.
Largely used in the construction of Iron Vessels, Buildings and Bridges.
WROUGHT IRON ROOF TRUSSES, GIRDERS & JOISTS,
and all kinds of Iron Framing used in the construction of Fire Proof Buildings.
PATENT WROUGHT IRON COLUMNS, WELDLESS EYE BARS,
and built up shapes for Iron Bridges.
REFINED BAR, SHAFTING, and every variety of **SHAPE IRON** made to order.
Plans and Specifications furnished. Address **DAVID REEVES, President.**
NEW YORK AGENTS, MILLIKEN & SMITH, 95 Liberty Street.
BOSTON AGENTS, FRED. A. HOUDLETTE & CO., 19 Battery March St.

ALAN WOOD & CO.,
MANUFACTURERS OF
Patent Finished, Galvanized, Common, Best Refined, Cleaned and Charcoal Bloom
PLATE & SHEET IRON.
No. 519 Arch St., Philadelphia, Pa.
Orders solicited especially for Corrugated, Gasholder, Pan and Elbow, Water Pipe, Smoke Stack, Tank and Boat Iron; Last, Stamping, Ferrule, Locomotive Headlight and Jacket Iron.

NAILS
JAS. ROWLAND & CO.,
Kensington Iron, Steel & Nail Works,
990 North Delaware Ave., - - PHILADELPHIA,
Manufacturers of the
Anvil Brand Refined Merchant Bar Iron.
Also, the James Rowland & Co. Kensington Nails, cut from their
Refined Anvil stock. Also, Plow and Cultivator Steel, Rounds,
Squares, Flats, Bands and Hoop Iron.
Correspondence with Dealers solicited.

PENCOYD IRON WORKS.
A. & P. ROBERTS & CO.,
Manufacturers of
CAR AXLES.
BAR, ANGLE, TEE AND CHANNEL IRON.
Office, No. 265 S. Fourth St., Philadelphia. Agents for the sale of Glamorgan Pig Iron.

FOUNDRY FACINGS.
REMOVED TO
1015 TO 1021 NORTH DELAWARE AVENUE
PIER 45
**MANUFACTURERS' FOUNDRY
SUPPLIES.**
MOULDING SAND.
German Lead, American Lead, Graphite, Plumbago, Bitumen, Anthracite, Charcoal, Mineral, Sieves,
hovels, Brushes, Crucibles, Machinery Sand, Brass Sand, Chandelier Sand, Stove Plate Sand.
J. W. PAXSON & CO., Philadelphia, Pa.

ALLENTOWN ROLLING MILL COMPANY,
Manufacturers of
Rails, Bars, Axles, Shafting, Fish Bars (Plain and Angle), Spikes,
Rivets, Bolts and Nuts, &c. Bridges and Turn Tables.
General Office, 237 South Third St., Philadelphia. Works at Allentown, Pa.

BOOTH, CARRETT & BLAIR,
Analytical and Consulting Chemists,
919 and 921 Chant St. (10th St. above Chestnut St.), PHILADELPHIA, PA.
Established in 1836.
Analyses of Ores, Waters, Metals and Alloys of all kinds. A special department for the
ANALYSIS OF IRON AND STEEL,
fitted with all the apparatus and appliances for the rapid and accurate analysis of Iron Steel, Iron
Ores, Slags, Limestones, Coals, Clays, Fire Sands, &c. Agents for sampling ores in New York and
Baltimore. Price lists on application.

Iron.
Edward J. Etting,
IRON BROKER AND COMMISSION MERCHANT,
230 S. Third St., Philadelphia, Pa.
Pig, Bar and Railroad Iron.
OLD RAILS, SCRAP, &c.
Agent for the
MOUNT SAVAGE FIRE BRICK,
The Allentown Iron Co. and
The Coleraine Furnaces.
STORAGE WHARF AND YARD
DELAWARE AVENUE ABOVE CALLOWHILL STREET,
CORNERED BY TRACK WITH RAILROAD.
Cash advances made on Iron.

J. Wesley Pullman,
407 Walnut St., Philadelphia,
Exclusive SALES AGENT
**Chester Iron Co.'s Blue, Red and Hot
ORES.**
Also celebrated "Brotherhood" Ore.
T. HORACE BROWN. D. W. R. READ.
D. W. R. READ & CO.,
Dealers and Commission Merchants in
ORES, METALS, &c.
Native and Foreign Iron, Manganese,
and other Ores.
205½ Walnut St., PHILADELPHIA.
Office in New York, 142 Pearl St.
Office in Baltimore, 67 S. Gay St.
Office in London, 57 Gracechurch St.

J. O. RICHARDSON,
IRON COMMISSION MERCHANT,
No. 232 Dock St., Philadelphia.
**Pig Iron, Railroad Iron and
Iron Ores.**
Sole Agent for the MONOCACY FURNACE CO.
DEALER IN
MOSELEM, ROCKHILL, WARWICK,
And other Favorite Brands.
SILVER GREY IRON A SPECIALTY.

J. W. HOFFMAN & CO.,
Iron Merchants & Railway Equipments.
208 South Fourth St., Philadelphia.
Sole agents Glasgow Iron Co. and Pine Iron Works
manufacturers of Muck Bar and all grades of Plate
Iron. Celebrated "Glasgow" and "Pine"
brands for fire boxes and difficult gauging. Pig and
Bar Iron, Rails and all shapes in Iron. Quotations
given on Bridge and Building Specifications.
WROUGHT IRON

Boiler Tubes,
Steam, Gas and Water Pipe.
Oil Well Tubing, Casing and
LINE PIPE.
Cotton Presses, Forgings,
**ROLLING MILL AND
General Machinery.**

READING IRON WORKS,
261 S. Fourth St., Philadelphia.
G. A. HEBERTON. S. FRANK SHARPLES.
HEBERTON & CO.,
Selling Agents and Commission Merchants
For the sale of
**Pig, Bloom, Plate, Bar, Scrap, Galvanized,
Black, Sheet, Pipe and Railroad
IRON.**
No. 333 Walnut St., Phila.
Charcoal Bloom and Pig a specialty.

IRON. STEEL.
SCRAP OF ALL KINDS A SPECIALTY.
First Quality Muck Bars.
SHIMER & CO.,
Late of and successors to W. HUTTON & CO.,
250 S. Third St., Philadelphia.

J. J. MOHR,
Iron Commission
Merchant,
No. 430 Walnut Street, Philadelphia.
Sole Agent for the Sheridan and Leesport Furnaces.
A. PURVES & SON,
Corner South & Penn Streets, Phila.,
Dealers in
Scrap Iron & Metals, Machinery, Tools,
Shafting & Pulleys, Steam Engines,
Pumps & Boilers, Copper, Brass,
Tin, Babbit Metals, Foundry
Facings. Best Quality Ingot Brass.
Cash paid for all kinds of Metals and Tools.

FRANCIS WISTER,
Sole Eastern Agent for
A. A. HUTCHINSON & BRO.
CONNELLSVILLE COKE.
ORES, Native and Foreign.
230 South Third Street, Philadelphia.

J. F. BAILEY & CO.,
216 South 4th St., Philadelphia. 52 Wall St., (Room 8) New York.
Selling Agents
ATKINS BROS.—BEAMS, CHANNELS, RAILS, &c.
**A. & P. Roberts & Co.—Car Axles, Plates, Channels, Tee,
Angle and Bar Iron.**
WILLIAM McILVAIN & SONS—Boiler, Ship and Bridge Plates.
BERWICK R. M. BARS AND SHAPE IRON.
Advances on Consignments of Old Material and sales promptly made.

CHAINS.
BRADLEE & CO., 516 Richmond Street,
Philadelphia.
Manufacturers of
Steel Chain and the Celebrated "D. B. G."
Special Crane Chain.
All Chains carefully tested and examined and certificate of proof
furnished. Dredging, Mining and Crane Chains, Rafting Chains,
Toggles, Eye Bolts and Log Dogs.

Iron.
JUSTICE COX, JR. CHARLES K. BARNES.
JUSTICE COX, JR. & CO.,
AGENTS FOR
CHICKIES ST. CHARLES, MONTGOMERY
WARWICK, CONEWAGO AND KEYSTONE
Foundry & Forge Pig Iron.
SHAWNEE ROLLING MILL CO., Limited,
Best Quality Muck Bar.
CATASAUQUA MFG. CO.'S
Bar, Angle, Skelp and Sheet Iron.
Railroad Car Axles. New and Old Rails.
No. 333 Walnut St., Philadelphia.

PETER WRIGHT & SONS,
307 Walnut Street, Philadelphia,
19 Broadway, New York,
44 Second Street, Baltimore,
Importers of
German and English

SPIEGELEISEN,
Pig, Scrap,
**NEW AND OLD RAILS,
And Iron Ore.**

E. W. CLARK & Co.
Bankers and Stock Exchange Brokers,
No. 35 South Third St., Philadelphia.
CLARK, POST & MARTIN,
No. 34 Pine St., New York,
Bankers and Railway Commission Merchants,
Importers of
Pig Iron, New and Old Rails, Scrap Iron, &c.



LOCOMOTIVE AND CAR WHEEL TIRES,
Manufactured from the celebrated OTIS STEEL.
BRAND
STANDARD.
Quality and efficiency fully guaranteed. Prices as
low as any of the same quality. We manufacture
Heavy and Light Forgings, Driving and Car Axles,
Crank Pins, Piston Rods, &c.
Works at Lewistown, Pa.
Office, 220 S. 4th St., Philadelphia, Pa.

**Italian and Spanish
CHARCOAL IRON,
CHILL-GRADED,
For Car Wheels, &c.**
FOR SALE BY
ALFRED EARNSHAW,
203 Walnut Place, PHILADELPHIA.

LANGHORNE WISTER. RODMAN WISTER.
L. & R. WISTER,
IRON BROKERS.
Agents for the Clearfield Fire Brick Co.'s
Fire Bricks.
No. 230 South 4th St., Philadelphia.



KEYSTONE HORSE SHOE CO.,
516 Richmond St., Philadelphia, Pa.
Manufacturers of the Keystone Patent Solid
Steel Calk Horse and Mule Shoes.
These Shoes are made of superior iron and steel,
completely finished and ready for cold shoeing;
have clip and solid steel calk. The holes are
punched through at the proper angles and free
from burrs. Same number of Shoes per keg as in
kegs of unfinished shoes.

a new aspect upon the question, and the
claim for superiority is as yet undecided
between steel and compound plates.

Amesbury Expansion Matcher Heads.
We show herewith an improved form
of matcher heads, made by G. W. Ames-
bury & Co., of 3101 and 3103 Chestnut
street, Philadelphia, Pa. They present some
features of great interest and value which
are worthy of the careful attention of wood
workers who employ power. These heads
are made in double sections, each portion
having its own work to do, and being so
adjustable that, without moving the bits

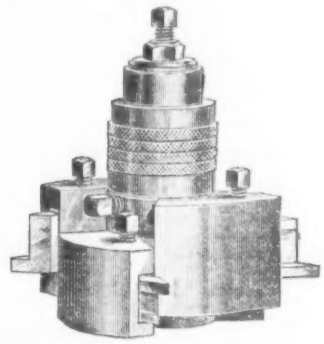


Fig. 1.

from their seats, any thickness of flooring or
other matched work can be finished. The
time needed for adjustment is only that
necessary for loosening a set-screw, and then
turning the collars B in the figures until
the horizontal distance between the upper
and lower cutters is correct for the required
width of tongue or groove. The different
forms of bits used for the two operations
are shown in the cuts. Fig. 1 being that
for making a groove and Fig. 2 the tongue;
the heads are the same. These are so made
that each pair does half of the cutting. They
make very smooth work on account of this
arrangement, not tearing the timber. The
bits themselves are made in such a way that
they can be sharpened by grinding instead
of filing. The cost of placing them is very
small. The user can easily make his own
bits if he so desires. The head can be sepa-

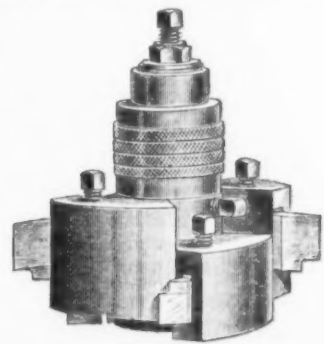


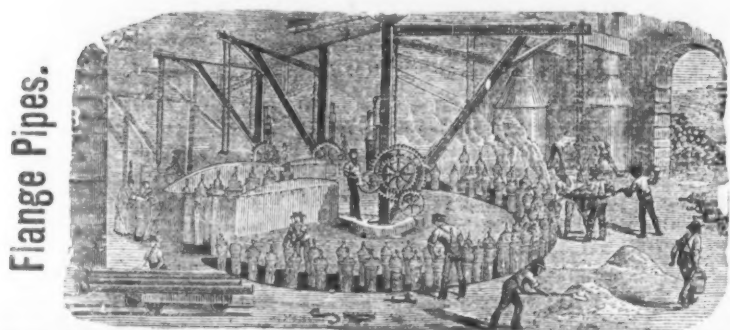
Fig. 2.

rated and the fixed portion used for any or-
dinary work, operating in that case, like
any fixed head, but having the advantage of
bits inclined away from the plane of rota-
tion, so as to secure a clearing at the leading
points, and doing away with friction back
of them. It is said on good authority that
these heads will turn out an unusually large
quantity of first-class work, and make a
great saving of time and power. The work
itself is said to be of a very superior quality,
even when cross-grained or knotty lumber
is used. The cost of the improved heads,
which are carefully finished in bronze, is
the same as the ordinary fixed iron head.

Future Mexican Cities.

An American sojourner at the Mexican
capital, who is eagerly watching the progress
of railroad improvements in that country,
attempts to forecast the future of Mexican
cities as affected by changes in the great
routes of travel and transportation. Puebla
now has a population of about 75,000. It
has been the chief center of the small manu-
facturing industry of the republic, turning
out cotton, woodwork, ironwork, and espe-
cially marble and onyx.
San Luis Potosi, 250 miles due north from
the national capital, is like Puebla, a natural
railroad center, situated in a rich mining
district and surrounded with all the resour-
ces of agriculture. Both of these cities are
soon to have railroad connections, not only
with each other, but with Vera Cruz at the
Gulf coast at Tampico. The latter also
will connect with the Pacific at Mazatlan
and probably at San Blas. The wonder is
what will become of Vera Cruz, with these
important routes working a diversion. The
writer referred to above says: "The work
of constructing a harbor at Tampico will be
much lighter than at Vera Cruz, and when
the Mexican Central branch is finished, no
sane traveler will take the risks of Vera
Cruz, if only on account of its bad name as a
fever city. * * According to all ac-
counts, the Gringos are crossing the line in
numbers equal to the hosts of Sennacherib,
and it does not seem to strike the Mexicans
that it will take powerful few Americans to
outnumber them. There are five frontier
States in the Northern Mexican tier—Sono-
ra, Chihuahua, Coahuila, Nueva Leon and
Tamaulipas—and these, with the two North-
western States of Sinaloa and Durango in
the second tier, make more than half the
area of the country. They are the scene of
the great Yankee invasion, yet they contain
less than a million of inhabitants, and in the
five Northwestern States there are districts
of thousands of square miles which have no
inhabitants at all. When we get American
mining camps there, and when towns
spring up along the American railroads, as
they have done at much less promising
points on the other side of the river, they are
going to be American towns. Nobody has
any dread of annexation. The Mexicans
place full reliance in our assurances that we
do not want it, and they have proof, strong
as holy writ, that the government at Wash-

A. H. McNEAL, BURLINGTON, N. J.



CAST IRON PIPES FOR WATER AND GAS.

ESTABLISHED IN 1848.
SINGER, NIMICK & CO., Limited,
PITTSBURGH, PA.

MANUFACTURERS OF ALL KINDS OF
HAMMERED AND ROLLED

STEEL,

Warranted Equal to any Produced.

BEST REFINED TOOL CAST STEEL

For Edge and Turning Tools, Taps, Dies, Drills, Punches, Shear-Knives,
Cold-Chisels and Machinists' Tools generally.

SAW PLATES

For Circular, Muley, Mill, Gang, Drag, Pit and Cross-Cut Saws.

Sheet Steel

For Springs, Billet Web and Hand Saws, Shovels, Cotton Gin Saws,
Stamping Cold, &c., &c.

SIEMENS-MARTIN (Open-Hearth) PLATE STEEL

For Boilers, Fire-Boxes, Smoke Stacks, Tanks, &c.

All our Plate and Sheet Steel being rolled by a Patented Improvement is unequalled for surface finish and exactness of gauge.

ROUND MACHINERY CAST STEEL

For Shafting, Spindles, Rollers, &c., &c.

File, Fork, Hoe, Rake, R. R. Frog, Toe-Calk, Sleigh-Shoe and Tire Steel, &c.;
Cast and German Spring and Flow Steel.

"Iron Center" Cast Flow Steel. Finished Rolling Flow Coilers with Patent Screw
"Soft Steel Center" Cast Flow Steel. Hubs attached.
"Solid Soft Center" Cast Flow Steel. Agricultural Steel cut to any pattern desired.
Steel Forgings made to order.

Represented at 59 Beekman St., New York, and 417 Commerce St., Philadelphia, by
HOGAN & BURROWS, Gen'l Agents for Eastern and New England States.

THE MIDVALE STEEL COMPANY, CRUCIBLE AND OPEN-HEARTH STEEL.

TIRES and AXLES OF EVERY DESCRIPTION.

A. G. TOMPKINS & CO., Boston
H. A. ROGERS, New York
W. H. WALLACE & CO., New York
MANNING, MAXWELL &
MOORE, New York.



Tool, Machinery and Spring Steel
Castings and Forgings.

Works and Office, Nicetown, Philadelphia, Pa. Warehouse, 12 N. 5th St., Philadelphia, Pa.

PHILADELPHIA STEEL FORCE.

TRADE MARK. "Anvil" Brand Best Refined
TOOL CAST STEEL.

Address all orders to
THE PHILADELPHIA STEEL FORCE,
FRANKFORD, PHILADELPHIA, PA.

Agents: HENRY G. NICHOLS, 14 Platt St., New York City. IRVIN & CO., So. 55 Howard St., Baltimore Md.

ESTABLISHED 1847. A. WHITNEY & SONS, PHILADELPHIA,

CHILLED RAILROAD WHEELS

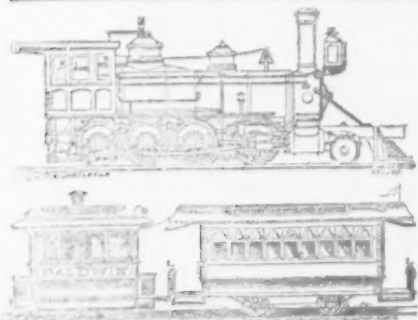
For every kind of service, including Street, Mine and Lumber Tramways. Wheels furnished in rough
bored or on axles. Chilled castings made to order.

PENNSYLVANIA STEEL COMPANY, Steel Rails, Frogs, Crossings & Switches.

Forgings for Piston Rods, Guide Bars, Wrist Pins and Machinery Purposes.

Works at Baldwin Station, Pennsylvania Railroad, near Harrisburg, Pa.

Address all orders to
PENNSYLVANIA STEEL COMPANY, 208 South Fourth Street, Philadelphia.



BALDWIN LOCOMOTIVE WORKS,

BURNHAM, PARRY, WILLIAMS & CO., Proprietors,
Philadelphia, Pa., U. S. A.

Manufacturers of
LOCOMOTIVE ENGINES
of every Description.

Catalogues, photographs and estimates fur-
nished on application of customers.

NOISELESS STEAM MOTORS,
For city and suburban Railways.

These machines are nearly noiseless in opera-
tion; show no smoke with the use of anthracite
coal or coke as fuel, and show no steam whatever
under ordinary conditions of service. They can
be run at two or three times the speed of horse
power and draw additional cars. Circulars with full particulars supplied.

ROANE IRON COMPANY, CHAS. G. LUNDELL.

Manufacturers of and Dealers in

Pig and Railroad Iron.

CHATTANOOGA, - - - - - TENN.

L. HERNSHEIM,

Importer and Commission Merchant,

105 John Street, NEW YORK.

NEW AND OLD STEEL AND IRON RAILS, STEEL RAIL BLOOMS,

Bessemer and Spiegel Iron, Ferromanganese.

Sole Agent for the United States for the

STEEL AND IRON WIRE RODS

AND FOR THE

HUTTENBERG (AUSTRIA) IRON WORKS,

CHARCOAL PIG IRON FOR CHILLED CAR WHEELS,

For the Siemens-Martin and Crucible Steel Manufacture.

EXTRA SOFT CHARCOAL STEEL BLOOMS, BILLETS AND RODS FOR COLD RIVETS, &c.

Superior Drill, Seythe, Tool and Die Steel Manufactured from Charcoal Iron,
&c., &c.

BRITTON IRON AND STEEL CO.,

MANUFACTURERS OF

IRON AND STEEL BOILER PLATE,

Tank, Bridge and Ship Plates,

BLACK AND GALVANIZED SHEET IRON.

Works foot of Wason St., cor. L. S. & M. S. R. R., CLEVELAND, O.

JACKSON IRON COMPANY,

Manufacturers of Fayette Pig Iron (L. S. Charcoal), Especially adapted for Bessemer, Siemens-Martin
Stewart Pig Iron (Birmingham Coal and Coke), Malleable and Car Wheel purposes.
Also, Hammered Blooms, Billets and Muck Bar, extra low in phosphorus, for Siemens Martin and
Crucible Steel. Miners of Jackson (Lake Superior) Iron Ores.
FAYETTE BROWN, Gen. Agent. HARVEY H. BROWN, Asst. Gen. Agent. Offices, 130 Water St.

HARVEY H. BROWN & CO.,

AGENTS

CHAMPION IRON CO., LAKE SUPERIOR IRON CO. } Lake Superior Iron Ores.

Dealers in Pig Iron, Iron Ores and Old Rails.

Offices, 130 Water Street, - - - CLEVELAND, OHIO.

ORFORD NICKEL AND COPPER COMPANY, SMELTERS AND REFINERS OF COPPER.

THOS. J. POPE & BRO., Agents, 292 Pearl St., New York.

Copper Ore, Mattes or Bullion purchased. Advances made on consignments for refining and sale.
Smelting and Refining Works at Bergen Point, near New York. Offices, 292 Pearl St., New York.

CHARLES HUBBARD, 46 Cliff St., New York City

HEAVY STEEL AND IRON FORGINGS,

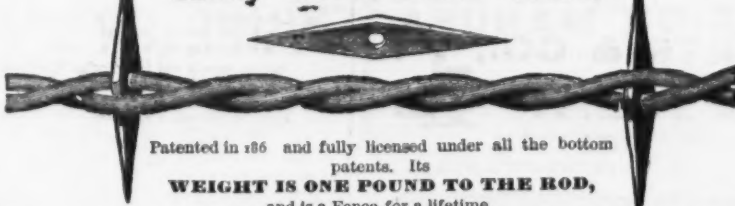
For Marine and Stationary Engines.

Homogeneous Steel Boiler Plate, "Nashua" Brand.

Best YORKSHIRE BAR, "TAYLOR" IRON, for Stamped Work, Screws, etc., etc.

MUSKET SPECIAL TOOL STEEL, requires neither tempering nor hardening.
Estimates given.

Kelly Steel Barb Wire.



Patented in 186 and fully licensed under all the bottom
patents. Its

WEIGHT IS ONE POUND TO THE ROD,
and is a Fence for a lifetime.

Is adopted by railroads, by stock raisers and by farmers generally, on account of its superior style
of barb, giving STRENGTH AND LIGHTNESS, and always holds its sharp point. In the

BARB WIRE LAW SUITS

a decision has been rendered sustaining all the Patents, and all manufacturers, dealers and
users infringing will be held liable for damages.

We do not sell to jobbers, but want one reliable retail dealer in each town.

THORN WIRE HEDGE CO., 15 to 21 N. Clinton St., Chicago.

IRON AND STEEL DRUG FORGINGS

All shapes, small and large, including
Gun, Pistol, Wrench Bars, &c. Also, Die Sinking. Manufacturers also of
Bricklayers', Moulders', and Plasterers' Tools, Saddlers'
Round and Head Knives.

WILLIAM ROSE & BROS.,

36th & Filbert Sts., West Philadelphia.

HOOPES & MERRY,

Manufacturers of

"LION" Brand or B. B. "PHENIX" Brand or Best Charcoal GALVANIZED SHEET IRON,

539, 541, 543, 545 and 547 West Fifteenth Street, New York.

Corrugated Sheet Iron. Black or Galvanized. All kinds of Ironwork. Tinned or Galvanized.

BIRMINGHAM ROLLING MILL CO.,

MANUFACTURERS OF

BAR, BAND AND HOOP IRON,

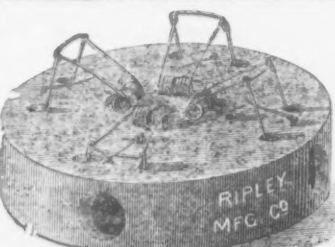
T-RAILS AND SPLICE BARS.

Also, Street and Tram Rails.

Birmingham, Alabama.

Head Office, Louisville, Ky.

We solicit inquiries for Bar Iron and small Rails. Orders filled promptly.



"COMMON SENSE" MOUSE TRAP. BEST IN MARKET.

For Home & Export Trade.

RIPLEY MFG. CO.,

Unionville, Ct., U. S. A.

Manufacturers of
Porcelain-Lined Lemon Squeezers, Mallets, Rose-
wood Faucets, Patent Boot Jacks and
House Furnishing Ware.

CHAS. G. LUNDELL.

No. 7 Exchange Place,

BOSTON,

Mass.

REPRESENTING
Ekman & Co.
GOTHENBURG,
SWEDEN.

NORTH BROS.,

23d and Race Sts., Philadelphia.

Fine Light and Medium-Weight GRAY
IRON CASTINGS to order.

Correspondence solicited.

WM. PAULSEN,

P. O. Box 3708, NEW YORK.

METAL COMMISSION MERCHANT.

Sole Agent for the well-known S S brand of
Spelter and refined Stolberg Pig Lead.

MOSES GOLDSMITH & SON

Key Box 156,

CHARLESTON, S. C.

Wholesale dealers in

METALS, IRON, RAGS,

And all kinds of Paper Stock.

We invite correspondence.



RR CAR WHEELS
CASTINGS OF ALL KINDS
BOWLER & Co. 9 WINTER ST. CLEVELAND

P. W. Gallaudet

& Co.

Cor. Broadway and Wall St., New York.
Bankers and dealers in COMMERCIAL PAPER.
Stocks and Bonds dealt in for cash or on margin at
New York Stock Exchange.



WM. McFARLAND,

Iron and Brass Founder,

TRENTON, N. J.

Chilled Cast Wire Dies a Specialty.

Any size or style made at short notice.

20,000 Sold the Second Year.

THE BEST ADJUSTABLE BAG HOLDER

In the World.



PRICE ONLY \$1.50.

Sent free, on receipt of the price, anywhere in the United States.

Just the thing for the Farmer, Thresher, Miller, the Feed Store, Grain, Potato, Guano and Phosphate dealers, Postmasters and Publishers, and to all others who use Sacks or Bags. It is indispensable. A perfect and simple device, made of iron, and will last a life time. Sold by the Hardware trade everywhere. Orders solicited. The platform is extra if wanted. Agents wanted everywhere. Address L. JEFF. SPRENGLE, Sole Manufacturer, Ashland, Ohio. None can do without it for \$1.50. Send for a circular.

Special discount to the trade.

MACHINERY FOR

Straightening and Cutting Wire

Of all Sizes to any Length.

Send Catalogue.

JOHN ADT,

New Haven, Conn., U. S. A.

Keystone Screw Co.

17th and Fenango Streets,

PHILADELPHIA.

J. BILLERBECK,

Manufacturer of

Iron Gimlet-Pointed Wood Screws

Bohren's Improved

PATE JAN. 4/1876.

Rubber Ball Faucet.

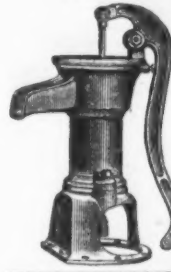
The best Wood and Metal Faucet yet made.

Never leaks, splits or shrinks. Is as durable as the brass stop-cock and is much cheaper. It does not poison the liquids. It is especially adapted for Export, as it is not affected by shrinkage.

U. BOHREN & CO., Manufacturers, 250 West 27th Street, New York. Send for Circular and Price List.

RUMSEY & CO.,

Seneca Falls, N. Y., U. S. A.,
Manufacturers of
800 STYLES OF HAND AND POWER
PUMPS,
FOR ALL PURPOSES AND USES.



HAND FIRE ENGINES.

Illustrated catalogues furnished upon application.
Factories, **SENECA FALLS, N. Y.** Warehouse, 93 Liberty St., New York City. L. M. RUMSEY & CO., Agents, St. Louis, Mo. BRINTNALL LAMB & Co., Agents, Chicago, Ill. MARCUS C. HAWLEY & Co., Agents, San Francisco, Cal. JUSTUS SCHMIDT, Agent, Hamburg, Germany.

Gilbert & Bennett Mfg. Co.,

GEORGETOWN CONN.,
MANUFACTURERS OF

IRON WIRE, SIEVES AND WIRE CLOTH.

Power Loom Painted Screen Wire Cloth,
GILBERT'S RIVAL ASH SIEVE

Galvanized Twist Wire Netting,
THE UNION METALLIC CLOTHES LINE WIRE

Warehouse, - 49 Cliff St., New York.

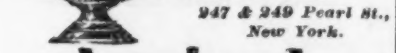
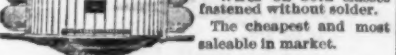
John Maxheimer,

Manufacturer of
Patented
Japaned, Tinned
Wire,
First and Second-
Class Brass

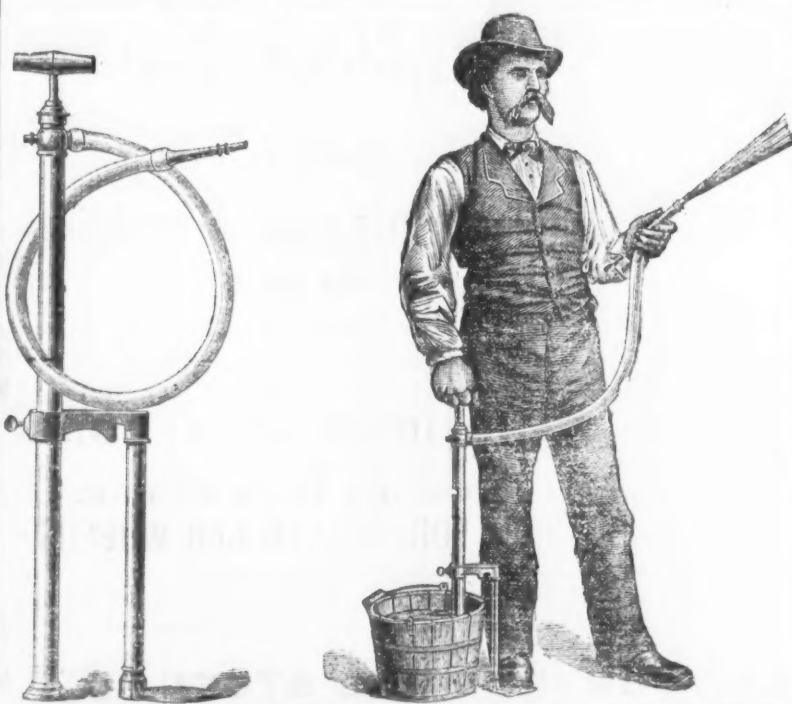
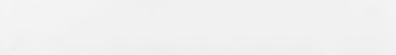
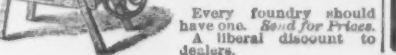
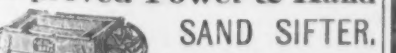
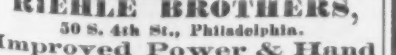
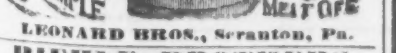
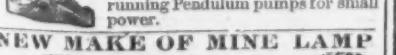
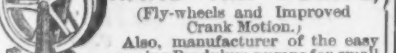
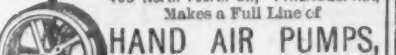
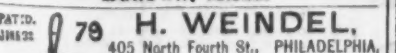
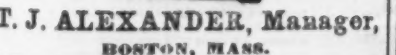
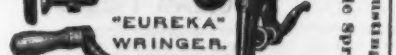
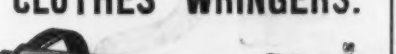
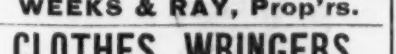
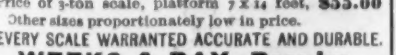
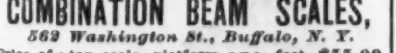
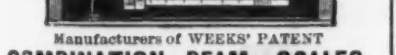
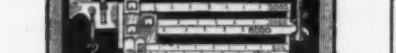
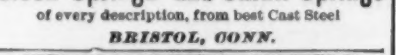
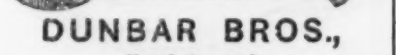
Bird Cages.

Wires on both classes
fastened without solder.
The cheapest and most
saleable in market.

947 & 949 Pearl St.,
New York.



Full Size of Second Class Brass.



The above cuts (Fig. 259) represent our **PATENT AQUAPULT**, so valuable a Hand Force Pump that certain competitors have made bold to infringe on same, and even to resort to the crime of plagiarism in using our cuts and trade-mark name of article to decoy customers away from our manufacture and invention; and we caution the trade and customers against purchasing this article when not made by ourselves, as we intend to protect our rights under our patent.

WE ARE THE ORIGINAL AND FIRST INVENTORS OF THIS STYLE OF PUMP, AND HOLD VALID LETTERS PATENT ON SAME, AND ANY STATEMENT THAT IT HAD BEEN IN THE MARKET PREVIOUS TO OUR MANUFACTURE OF SAME IS OF COURSE ABSURD AND WITHOUT THE SLIGHTEST FOUNDATION IN TRUTH.

W. & B. DOUGLAS, Middletown, Conn.

BRANCH WAREHOUSES:
85 and 87 JOHN STREET, NEW YORK, and 197 LAKE STREET, CHICAGO, ILL.

UNION MANUFACTURING CO.

Sole Manufacturers of

Skinner's Patent Combination Chuck.

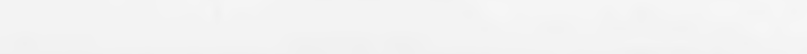
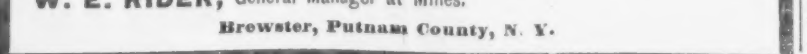
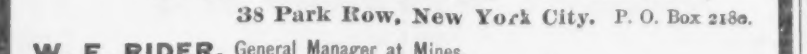
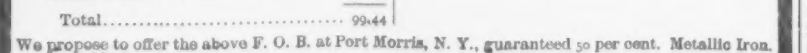
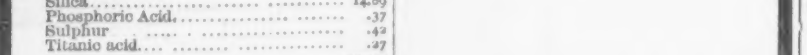
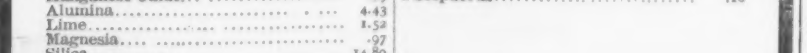
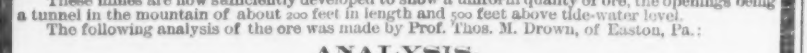
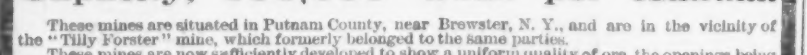
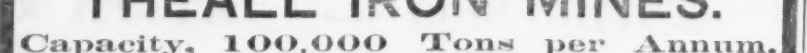
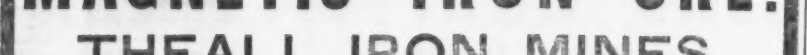
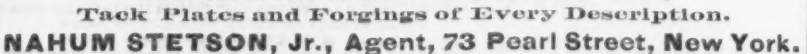
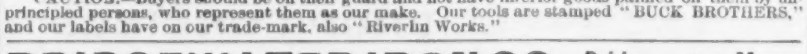
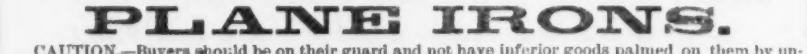
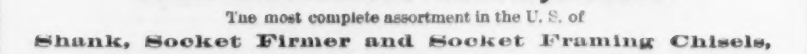
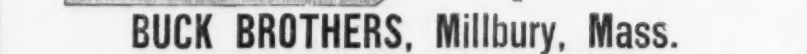
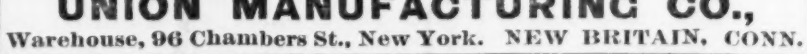
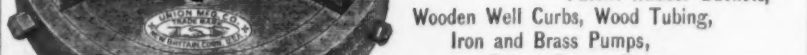
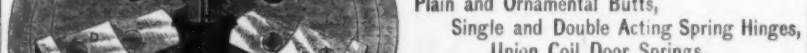
UNIVERSAL, INDEPENDENT AND ECCENTRIC.

By sliding a stud on the back of chuck it is instantly changed from Universal to Independent, and vice versa. Each Chuck is guaranteed perfect. All parts are made interchangeable. Only the very best materials used in their construction. Reversible or special jaws furnished when desired.

We also manufacture
Plain and Ornamental Butts,
Single and Double Acting Spring Hinges,
Union Coil Door Springs,
Galvanized Pump Chain,
Patent Rubber Buckets,
Wooden Well Curbs, Wood Tubing,
Iron and Brass Pumps,
Patent Copper Pumps,
Hydraulic Rams, Power Pumps,
&c., &c., &c.

Write us for prices.

UNION MANUFACTURING CO.,
Warehouse, 96 Chambers St., New York. NEW BRITAIN, CONN.



ington honestly desires to keep its hands off Mexico. But the difference between annexing Mexico and occupying it is very slight. There are great possibilities opening out for Mexico, which some of her statesmen seem in part to comprehend; but they may be more radical, as affecting her centers of population, commerce and industries, than the world at large now anticipates.

Iron Mining in the United States.

A preliminary report upon the production of iron ore in the United States during the year ending June 1, 1887, prepared by Raphael Pumpelly, special agent of the census, has been submitted to the superintendent, Gen. F. A. Walker. In the preparation of this report the assistance of a large number of eminent men, like Prof. Shaler, of Harvard College; Prof. Smock, of Rutgers; Patten, of Washington University, St. Louis; Hall, of Johns Hopkins University; Chamberlain, of Beloit College, and President Orton, of the University of Ohio, has been received. The iron-producing States, in order of the production of 1880, are given as follows:

States.	Product in tons of 2,000 lbs.	Per cent. of total product.	Per cent. of total value of product.
Pennsylvania.....	8,173,415	27.00	22.57
Michigan.....	1,814,713	23.37	25.27
New York.....	1,239,939	15.46	13.23
New Jersey.....	799,545	9.97	13.82
Ohio.....	604,241	7.53	5.92
Missouri.....	386,197	4.81	7.20
Alabama.....	191,676	2.39	8.99
Virginia.....	170,000	2.12	1.675
Maryland.....	138,709	1.73	1.805
Tennessee.....	104,465	1.30	.641
Georgia.....	84,406	1.04	.625
Kentucky.....	64,809	.808	.728
Massachusetts.....	62,637	.780	.034
West Virginia.....	60,371	.752	.386
Wisconsin.....	41,440	.517	.318
Connecticut.....	35,018	.437	.443
Oregon.....	6,472	.081	.020
Maine.....	6,300	.078	.039
Texas.....	3,600	.045	.035
North Carolina.....	3,318	.041	.023
Delaware.....	2,726	.034	.029
Vermont.....	850	.010	.012
Indiana.....	513	.006	.004
Total U. S.....	8,022,398		

Sixteen States only were reported in the census of 1870 as producers of iron ore, with the following relative rank:

Pennsylvania, Michigan, New York, New Jersey, Ohio, Missouri, Maryland, Tennessee, Massachusetts, Wisconsin, Kentucky, Virginia, Vermont, North Carolina, Delaware and Indiana. The six great iron States retain in 1880 their former relative rank, and Alabama—a new State—takes the rank next to them. Pennsylvania and Michigan yield nearly half the entire product. The six States at the head of the list yield 87.73 per cent. of the total. The new non-producing States are Alabama, Georgia, West Virginia, Connecticut, Oregon, Maine and Texas. They produce 3.77 per cent. of the product.

Eleven counties produce 55.14 per cent. of the entire product, of which Marquette County, Mich., is credited with 17.14 per cent. The eleven counties are:

County.	Tons.
Marquette, Mich.....	1,374,812
Essex, N. Y.....	629,914
Morris, N. J.....	506,420
Menominee, Mich.....	499,900
Lehigh, Pa.....	321,322
Lebanon, Pa.....	285,509
Berks, Pa.....	252,040
Blair, Pa.....	154,914
St. Francois, Mo.....	144,805
Dutchess, N. Y.....	123,510
Northampton, Pa.....	104,788
Total.....	4,493,793

Fifteen other counties in six States produced over 50,000 tons each, and 12.83 per cent. of the entire product. They are:

County.	Tons.
Clinton, N. Y.....	92,166
Orange, N. Y.....	88,988
Crawford, Mo.....	87,004
Putnam, N. Y.....	76,740
Sussex, N. J.....	70,305
Cumberland, Pa.....	67,846
Jefferson, N. Y.....	63,924
Fayette, Pa.....	63,792
York, Pa.....	63,570
Lancaster, Pa.....	63,274
Berkshire, Mass.....	63,637
Lawrence, Ohio.....	62,599
Dent, Mo.....	58,878
Iron, Mo.....	57,207
Warren, N. J.....	50,214
Total.....	1,079,516

Reports were received from 135 counties, as against 71 counties in the census of 1870. The 76 counties above named produce 67.97 per cent. of the entire product—leaving 32.03 per cent. to be spread over the remaining 109 counties.

A consolidated table shows the following aggregate results:

Number of counties.....	105
Number of establishments.....	801
Maximum yearly capacity (tons of ore).....	12,395,933
Product in census year.....	7,006,417
Value of product of establishments.....	\$20,277,482
Regular product, tons.....	1,015,981
Total product census year, tons.....	8,022,398
Value of total product.....	\$22,975,345
Value of materials used in regular industry.....	\$2,816,744
Wages paid in establishments of regular industry.....	\$9,420,655
Men employed above ground.....	10,250
Men employed below ground.....	11,593
Boys under 16 employed above ground.....	1,115
Boys employed below ground.....	414
Total employees in regular establishments.....	31,412
Number of miners.....	17,774
Number of laborers.....	12,443
Number of administrative force.....	1,245
Number of steam engines.....	857
Total horse-power.....	24,815
Value of all machinery.....	\$1,207,820
Cost of explosives used.....	\$175,047
Number of horses used in regular industry.....	2,669
Number of mules used in regular industry.....	1,245
Amount used as working capital.....	\$4,822,413
Value of plant.....	\$1,045,075
Value of real estate.....	\$48,166,449
Total capital employed and invested in regular industry.....	\$61,637,937
Number of tons on which royalty is paid.....	2,827,898
Gross amount paid as royalty in census year.....	\$99,053

Under the head of irregular product in the above is given the amount of ore raised in the census year (ending June 1, 1880) by persons the principal part of whose livelihood was obtained in some other way, generally by farming. In twelve of the States there are localities where soft ore can be obtained from surface digging. These are worked by farmers during the intervals of agricultural employment, the product drawn by farm teams to the nearest furnace and sold. The quantities of ore so produced by individuals vary from 5 to 500 tons. For this reason,

no items based on this irregular product appear in the columns of employees' wages, material, capital, &c.

The total production (8,022,398 tons) exceeds the amount reported by Special Agent Swank as consumed in manufactures by 312,692 tons. There were imported, during the period embraced in these reports, at the ports of Buffalo, Boston, Oswego, Philadelphia, New York and Baltimore, not far from 424,892 tons, from which it would appear that the stocks of ore on hand must have increased about 737,504 tons, or, that less than nine-tenths of the ore produced was consumed in the period. In view of the fact that there was a scarcity of iron ore in 1870, and that many new mines were opened in consequence, whose stock failed to reach consumers before the summer of 1880, the two results are easily reconcilable.

The term "real estate" is used to denote the land as a mineral producer, its value as such being considered apart from its possible value for agricultural or forestry purposes. This value is a fund which is constantly diminished as the ore is withdrawn and eventually reaches zero, and must be made good by capitalizing the royalties. The lands in question are not wild lands, but such as are attached to a working mine. Their acreage cannot be given, as ore deposits are irregular, but their extent is such that for all practicable purposes their present annual yield may be regarded as not likely to be diminished for many years.

A table in the report shows the changes in the iron-ore mining industry during the past decade, expressed in percentages on the returns of 1870. It is as follows:

	Per cent.
Gain in number of establishments.....	90
Gain in number of employees.....	109
Gain in horse-power of steam engines.....	109
Gain in amount paid as wages.....	38
Gain in amount paid for material.....	129
Gain in total capital.....	249
Loss in value per ton of product.....	25.56
Gain in value of total product.....	74
Gain in tonnage of total product.....	136
Gain in product of regular establishments.....	106
Loss in yearly income of man.....	31.95
Loss in per cent. of value of product paid for labor.....	5.22
Gain in per cent. of value of product paid for material.....	4.20
Gain in per cent. of value of product retained for royalty, interest, profits, &c.....	1.02

A fall in price is shown from \$3.80 per ton to \$2.89, or 25.56 per cent. As gold averaged about 35 per cent. above the paper dollar in 1870, the true fall in iron ore is only 14 cents a ton. But a very small fraction of time was lost during the year by strikers, showing harmony between capital and labor. In Kentucky it amounted to 1.2 per cent. of the working time, in New Jersey to 0.79 per cent., in Ohio, 0.72 per cent., in West Virginia to 0.37, and in Pennsylvania to 0.46 per cent.—or to but about the averaging working lifetime of two men. While the annual product, as will be observed, is but little in excess of half of the maximum capacity, the mines which yield ore fit for the manufacture of Bessemer steel approach much nearer their greatest possible yield. The present report will soon be followed by another, prepared by the same gentlemen, giving the distribution and amounts of various kinds of ore and their chemical analysis.

Condition of Business—Failures in the Last Three Months.

The following shows the number of failures in the United States and Canada, for the quarter ending September 30, 1887, compared with the same quarter in 1880, together with the amount of liabilities as reported by the Mercantile Agency:

	Third Quarter 1887.	Third Quarter 1880.
Number of Failures.....	150	181
Amount of Liabilities, in billions.....	\$1,485,447	\$1,135,205
States and Territories.....	994	311
U. S. States.....	1,054,107	84,772
W. States.....	2,248,338	2,895,349
P. States & Territories.....	141	1,121,707
Total.....	1084	\$10,112,365
Dominion of Canada.....	130	787,889
Total.....	1214	\$10,900,254

The foregoing table shows that the failures during the last three months have been 1024, with liabilities of \$10,112,365, while for the corresponding period in 1880 they were 979, with liabilities of \$12,121,422. The geographical distribution of the failures in the last three months shows that the Southern States have suffered, inasmuch as the figures indicate that the liabilities of 1880 were only \$848,772, as against \$1,054,107 for the present quarter; while for the Western States the liabilities show a decline of nearly \$650,000 in favor of this quarter. In the Middle States the liabilities are about \$1,000,000 less in amount than in the corresponding quarter of 1880. In the Eastern and Pacific States the combined amounts of liabilities are but little different from those of last year. Notwithstanding a decrease in amount of liabilities for the past three months, as compared with 1880, the total liabilities for the last nine months show an excess of \$6,000,000 over the figures of 1880. This increase occurred in the first quarter of the present year, when the liabilities showed an excess of \$12,000,000 over those in 1880. This excess has been reduced by the smaller amounts of the last two quarters.

In Canada an exceptionally good condition of affairs has prevailed, the failures for the last three months having been 130, with liabilities of \$787,889. This is a better showing than has been made in the Dominion for any quarter during the past six years.

The Marquette (Lake Superior) Mining Journal describes the machinery for working the gates and valves of the improved St. Mary's canal: The motive power is furnished by two 26-inch Kison turbine wheels. These wheels operate two force pumps, by which water is forced into an accumulator loaded to 100 pounds to the square inch. Communication can be opened at will between the accumulator and any cylinder about the lock. The machines for opening and closing the gates consist of hydraulic cylinders fitted with the ordinary arrangement of pulley blocks for multiplying motion, which, with these machines, is multiplied four times; a single stroke of the piston takes in 34 feet

T. J. ALEXANDER, Manager,
BOSTON, MASS.

H. WEINDEL,
405 North Fourth St., PHILADELPHIA,
Makes a Full Line of

HAND AIR PUMPS,

(Fly-wheels and Improved
Crank Motion.)

Also, manufacturer of the easy
running Pendulum pumps for small
power.

NEW MAKE OF MINE LAMP

THREE DIFFERENT
SIZES
SEND
15 CENTS
FOR SAMPLE

SEAMLESS
BRASS
COLLAR,
BRASS HINGE,
Solid Lid.

NO SOLDERING
THE HINGE
CANNOT
MELT OFF

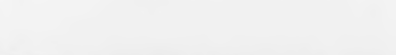
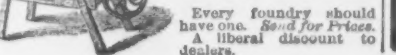
LEONARD BROS., Scranton, Pa.

RIEHL BROTHERS,
50 S. 4th St., Philadelphia.

Improved Power & Hand

SAND SIFTER.

Every foundry should
have one. Send for Prices.
A liberal discount to
dealers.



We propose to offer the above F. O. B. at Port Morris, N. Y., guaranteed 50 per cent. Metallic Iron.

J. H. CHEEVER, Treasurer,
38 Park Row, New York City. P. O.

AUBURN FILE WORKS,

Superior Hand-Cut
FILES AND RASPS,
MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.
FULLER BROS., Sole Agents,
89 Chambers and 71 Reade Streets, N. Y.

Paris, 1878.

**McCAFFREY & BRO.,**

PENNSYLVANIA FILE WORKS,

Philadelphia, Pa., U. S.

For Superiority.



Manufacture and keep in stock a full line of **FILES** and **RASPS** only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

Superiority acknowledged wherever used, sold or exhibited.

GRAHAM & HAINES,

F. O. Box 1042. 113 Chambers and 95 Reade Streets, New York.

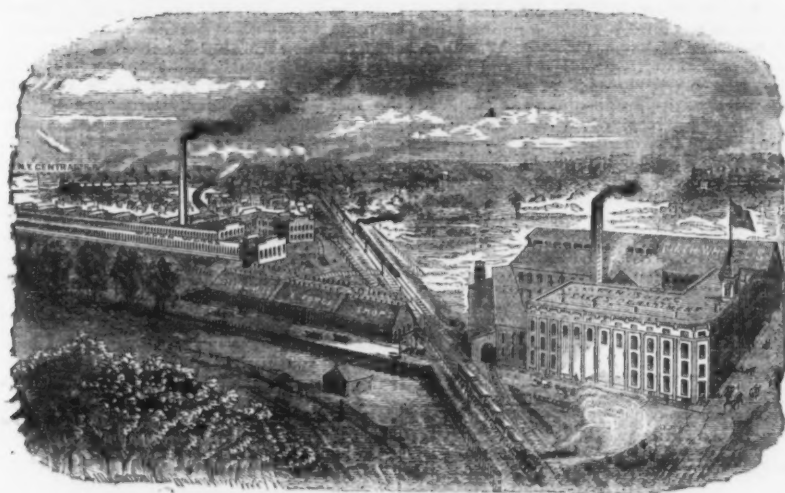
HARDWARE MANUFACTURERS' AGENTS, as follows:

Detroit Block Works,
Tackle Blocks,
Howard Bros. & Co.,
Cotton, Wool and Curry Cards
Thompson, Derby & Co.,
Seythe Snaths.
Osteo Fork Mills,
Steel Forks, Rakes, Hoes, &c.
H. Knickerbocker,
Seythes, Axes and Tools.
H. W. Kipp, Nail Hammers.
Iron City Tool Works Ltd., Vises,
Picks, Mattocks, Grub Hoes, &c.
Jacobus & Nimick Mfg. Co.,
Locks, &c.
Sandusky Tool Co.,
Planes and Plane Irons.
Geo. H. Eddy & Co.,
Measuring Tapes.

Wheeling Hinge Co.,
Hinges and Wrought Butts.
Northwestern Horse Nail Co.,
Horse Nails.
A. G. Coe & Co.,
Coe's Genuine Screw Wrenches.
F. K. Stuby, Emery Cloth.
Bedgwick Mfg. Co.,
Butter and Flour Triers, etc.
Ripley Mfg. Co., Mouse Traps.
Sam'l Loring,
Plymouth Tack & Rivet Works.
Carr, Crutley & Deolin,
Miscellaneous Hardware & Cast
Butts.
J. Mattinson,
Cast Steel Shears and Sissors.
Ketchum's Pat. Metallic Sieves.

W. D. Turner & Co.,
Geneva Hand Fluters.
American Screw Co.,
Gimlet Pointed Screws, &c.
Romer & Co., Brass Locks, &c.
P. Lozentraut, Compasses,
Callipers, Dividers, &c.
Clark Bros. & Co.,
Carriage Bolts, &c.
Louvre & Tucker, the Gen
line Knox Fluting Machine.
T. B. Barelay,
"Dodge's" Kentucky Cow Bells.
Lane Bros., Swift's and Gro
cers' Coffee Mills and Measuring
Faucets, &c.
T. C. Richards Hardware Co.
Bright Wire Goods. Picture Nails,
&c.

CARRIAGE HARDWARE.



Our new Illustrated Catalogue of 140 pages, and over 300 illustrations, will be mailed on application.

THE E. D. CLAPP MFG. CO., Auburn, N. Y.

THE TURNER & SEYMOUR MFG. CO.,

WOLCOTTVILLE, CONN.,

MANUFACTURERS OF

Upholsterers', Stationers', House Furnishing & Fancy HARDWARE AND NOTIONS.



The Turner and Seymour Mfg. Co. have been longer in the business and make a greater variety of **Cast Iron Scissors and Shears** than any other concern in the world. Our

"AMERICAN" SHEARS

have long been conceded to be the best ever made. The quality and finish of these goods shall always be maintained. To meet the demand for a cheaper line we offer the trade our

"CLIPPER" SHEARS.

On these we cannot be undersold. Price is about 25 per cent. less than the "American."

We are now making a fine line of cheap

Nickel Plated Scissors and Shears, Nut Picks,
Nut Crackers, Fruit Knives &c.

Price Lists furnished on application.

TACKS, NAILS & RIVETS.

Swedes Iron Upholsterers' Gimp, Lace and Cord Tacks. Black and Tinned Trunk and Clout Nails.
Finishing Nails and Straps; Shoe Nails of Swedes and Common Iron; Copper, Brass & Steel
Lining & Saddle Nails; Tuffing Nails & Tuffing Tuttons; Brass and Iron Wire
Nails, Molding Nails, Frenchon Pins, Black and Galvanized
Regular and Chisel Pointed Boat Nails.

New York salesroom, 116 Chambers Street.

AMERICAN TACK CO., Fairhaven, Mass.

R. COOK & SONS,

Manufacturers of

Carriage & Wagon AXLES.

WINSTED, CONN.

ESTABLISHED 1839.

HAND-CUT

FILES

JOHNSON & BRO.

No. 1 Commercial Street, Newark, N. J.

Nicholson FILES.

Bandsaw Files,
Boot Heel,
Brass,
Cabinet,
Cant,
Cotter Taper,
Cotter Equaling,
Cross or Crossing,
Doctor,
Drill,
Feather Edge,
Finishing,
Flat,
Flat Equaling,
Flat Wood,
Gang-Edger,
Ginsaw,
Gulleting,
Half-Round,
Half-Round Wood,
Hand,
Hand Equaling,
Handsaw Blunt,
Handsaw (Double-End),
Handsaw Taper, single cut,
Handsaw Taper, double cut,
Handsaw Taper, slim,
High Back,
Hook-Tooth,
Knife,
Knife Blunt,
Lead Float,
Lightning,
Machine Mill,
Mill,
Mill Blunt,
Mill Pointing,
Pillar,
Pitaw,
Reaper,
Roller,
Round,
Round Blunt,
Slotting,
Slim Handsaw Taper,
Square,
Square Blunt,
Square Equaling Files,
Stave Saw,
Three-Square Files,
Three-Square Blunt Files,
Tumbler Files,
Union Cut,
Warding Files,
Warding Blunt File,
Warding Round Edge File.

RASPS.

Baker's,
Beveled Edge,
Bread,
Cabinet,
File, Flat and Half Round,
Flat Shoe,
Flat Wood,
Half-Round Shoe,
Half-Round Wood,
Horse, Plain and Tanged,
Horse Mouth,
Jig,
Oval or French Shoe,
Racer, Plain and Tanged.

SPECIALTIES.

Butchers' Steels, Improved,
Bent Riffers, Handled,
File Cards,
File Brushes,
Machinists' Scrapers,
Stub Files & Holder, Detach-
able.
Surface File Holder,
Vise File Holder.

NICHOLSON

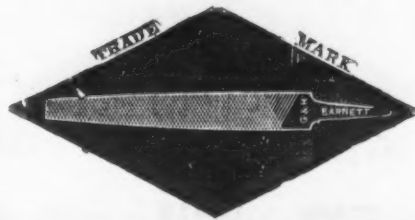
FILE CO.,

PROVIDENCE,

R. I.,

SOLE MANUFACTURERS.

Black Diamond File Works.



Awarded by Jurors of Centennial Exposition, 1876, for
"VERY SUPERIOR GOODS."

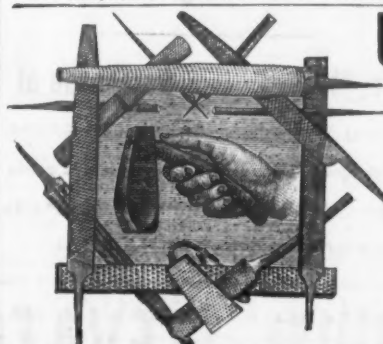
G. & H. BARNETT

39, 41 & 43 Richmond St., Philadelphia.

CHARLES B. PAUL,

Manufacturer of HAND CUT FILES.

Warranted CAST STEEL. 187 Tenth Street, Williamsburg, New York.
All descriptions of Files made to order. Price List mailed on application. Established 1863.



UNION FILE WORKS,

311 to 315 North St.,

BALTIMORE, MD.,

Manufacturers of

FILES AND RASPS

Made from the Best Refined Cast Steel.
With all the requisite facilities to produce a
first-class article, we are enabled to offer Files
that will give entire satisfaction.

MORITZ & KEIDEL, Agents,

48 & 50 German St., Baltimore, Md.

ESTABLISHED 1842.

INCORPORATED 1881.

CHAS. F. CRIPPS, President.

GILBERT PARKER, Treas. and Gen. Agent.

THE J. BARTON SMITH CO.,

Manufacturers of the Celebrated

J. B. SMITH'S FILES, RASPS, WOOD SAWS, &c.,

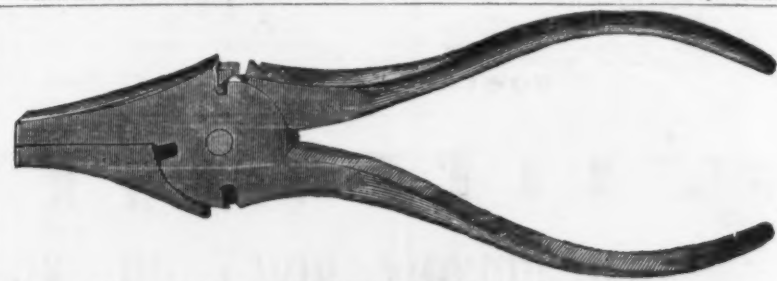
211, 215 & 217 New Street, PHILADELPHIA.

New York Branch, 128 Chambers Street.

WM. H. BRAMHALL, Manager.

Prices the lowest. Goods the best.

Send for sample order.



J. M. KING & CO.

WATERFORD, N. Y.,

Manufacturers of the BUTTONS PATENT

"WIRE CUTTER AND PLIER COMBINED."

Specially Adapted for Use on Wire Fence.

Also Manufacturers of
Blacksmith and Machinists' Stocks and Dies, Plug and Taper Taps,
Hand, Nut and Screw Taps, Pipe Taps and Reamers.
Price List on application. Established by DANIEL B. KING, 1859.

LANE'S MEASURING FAUCET.

Price, \$3.00.

For Light or Heavy Molasses, Oils,
Varnishes or other Fluids.

We warrant these Faucets to be as represented, measuring correctly and working more easily in heavy molasses than any measuring faucet in the market. No grocer can afford to be without them, for they save time, and "time is money." They insure perfect cleanliness, requiring no tin measures or funnel to collect dirt and draw files. They do not drip. They prevent all waste, as no molasses or other fluid can pass except when the crank is turned. They are the embodiment of simplicity, and consequently they are always in order. They work easily in the heaviest molasses. They are warranted to measure correctly, according to U. S. Standard.

MANUFACTURED EXCLUSIVELY BY

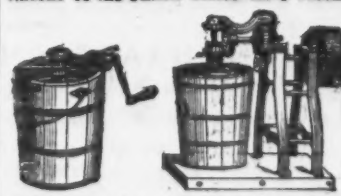
LANE BROS., Millbrook, N. Y.

General Agency, GRAHAM & HAINES, 113 Chambers St., New York.



SANDS' TRIPLE MOTION WHITE MOUNTAIN ICE CREAM FREEZERS.

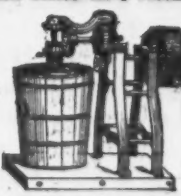
THE WHITE MOUNTAIN FREEZER COMPANY are headquarters for Ice Cream Freezers and Ice Crushers, being the only firm in the United States who manufacture all parts of the raw material. The examining committee, consisting of 50,000 citizens of the United States have recom-



HAND FREEZER.

2 to 25 qts.

\$3.50 to \$25.00.



HAND OR POWER

ICE CRUSHER.

\$75.00 and \$175.00.

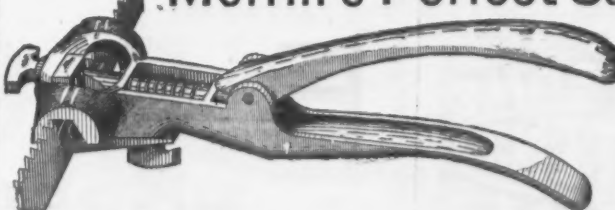


White Mountain Freezer Co.,

Nashua, N. H., U. S. A.

SPECIAL ATTENTION GIVEN TO EXPORT ORDERS.

Morrill's Perfect Saw Sets.



For price lists and

discounts, address

ASA FARR,

64 College Place,

corner of

Chambers Street,

New York.

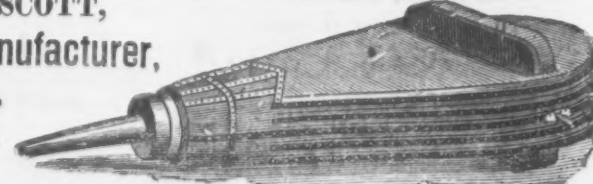
GEO. M. SCOTT,

Bellows Manufacturer,

Johnson Street,

Cor. 32d St.,

CHICAGO, ILL.



A. FIELD & SONS,

TAUNTON, MASS.,

MANUFACTURERS OF

AMERICAN AND FRENCH
WIRE NAILS,
TACKS, SHOE NAILS,
And Every Variety of Small Nails.

Offices & Factories at Taunton, Mass.

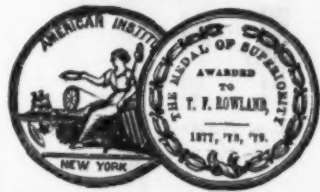
Warehouse at 78 Chambers St., New York,

where may be found a full assortment of Tacks, Brads, Wire Nails, &c., for the accommodation of the New York Wholesale and Jobbing Trade.

Any variations from the regular size or shape of the above-named goods made from sample to order.

A SILVER MEDAL has been awarded above goods at the Paris Exposition, being the only medal awarded any American manufacturer of Tacks and Wire Nails.

DUC'S PREMIUM ELEVATOR BUCKET.

ALWAYS FIRST
COMPETITIVEPREMIUM IN
TESTS.

This Bucket is struck out from the best charcoal iron; consequently is very durable. It requires 90 per cent. less power to run it than the old-fashioned square bucket, and will outwear half a dozen of them. Over 200,000 are now in use by the principal Millers, Brewers, Distillers and Manufacturers at home and abroad. It is the best Bucket made.

CAUTION.—The popularity of the DUC BUCKET has caused many manufacturers of the old style of Elevator Bucket to closely imitate its spherical shape. We warn all parties against patronizing infringers of our patents, as they will be held accountable. Send for circular. Address

T. F. ROWLAND, Sole Manufacturer, Continental Works, BROOKLYN, N. Y.



The Mill Bucket, in sizes from 3 1/2 to 16 inches.

OLD COLONY RIVET CO., Kingston, Mass.
(Established 1866.)
Manufacturers of NORWAY IRON RIVETS of Superior quality.

We carry a large stock of the various sizes of *Tinners', Carriage, Wagon, Hame, Belt, Barrel, Safe and Tank Rivets*, and make promptly to order all sizes not larger than 7-16 inch diameter. We have a capacity of two tons of the various sizes of small Rivets per day of ten hours. Freight allowed to all points on or east of the Mississippi River. Correspondence with buyers solicited.

WILLIAM H. DUNBAR, President. HENRY HOBART, Treasurer.
JAMES L. HALL, General Agent and Manager.

We carry the most complete stock in the city with our New York agents, *The American Rivet Co.*, 116 Chambers St.



NOTICE TO THE TRADE.

There are six patents, domestic and foreign, on

Rubber Window Cleaners.

We own them all, and shall suppress infringements. The genuine cleaner is plainly stamped, "Manufactured by Perfection Window Cleaner Co., incorporated July 26, 1878." Has patent hollow handle with P. W. C. Co. cast in face. Our manufacturing facilities are so large that we undersell cheap and worthless imitations. We gladly mail sample cleaner with price lists to wholesale trade. Address,

Perfection Window Cleaner Co.,

167 Madison St., Chicago, Ill.

AGENTS IN ALL FOREIGN COUNTRIES.

119 South Fourth Street,
PHILADELPHIA

Branch Office, 605 Seventh St. Washington, D. C.

S. HOWSON, Engineer and Designer of Patents.

S. HOWSON, Attorney at Law and Counsel in Patent Cases.

THE ANSONIA CORRUGATED STOVE PLATFORM,
With Patented O. G. Border.ROUND ZINC.
27, 30, 32, 34, 36 inch.

Manufactured of heavy metal, requiring no nailing or lining, the edge retaining its form. Superior pattern, finish and quality. Price as low as any.

Send for List and Discount.

Packed 12 in each case.

PURE ELECTRIC WIRE,

Manufactured by the

ANSONIA BRASS AND COPPER COMPANY,
For Magnets, Telegraphs, Telephones, &c.

Insulated on the bare wire with H. Spilldorf's patented Liquid Insulation, covered with cotton or silk.

All sizes of Bare and Covered Wire in Stock.

The conductivity of every bundle tested and warranted.

THE ANSONIA WROUGHT GONGS,

For Clocks, Indicators, Telephones, Call Bells, Bell Purses, Steamboat and Railroad Use. Burnished or Nickel Plated.

ANSONIA BRASS AND COPPER CO., 19 Cliff St., New York.

E S S E X
HORSE NAILS.

Hot Forged, Warranted Best Quality, Pointed and Polished.

HOWE & CO., Troy, N. Y., Sole Agents.

of the line attached to the gate, which is sufficient to open or close it. The lock is filled through two culverts underneath the floor, and which extend along its whole length. Each culvert is closed by a single valve, 8 by 10 feet in size, hung on a central horizontal axis, and which is opened or closed by a single stroke of a hydraulic cylinder. The culverts for emptying the lock are short, passing under the floor at the lower gates, and are provided with the same kind of valves and machinery for their operation as the filling culverts. In the operation of the lock only one turbine and one forced pump are used, the others being kept in reserve. Hand winches are provided for the operation of the gates in case of accident to the machines. The machinery works to a charm, and the locks can be filled or emptied and the gates opened or closed in a mere fraction of the time required at the old canal.

The Qualities of Iron and Steel.

The German railway union, which at the present time includes 53 German, 37 Austrian and 11 Dutch and Belgian lines, has collected the results of the investigation into the properties of iron and steel, which was undertaken at the Munich meeting of July, 1876, when the following resolutions were agreed to as a basis:

(a). A definite public classification of iron and steel is in the highest degree desirable.

(b). In carrying out this classification, official testing stations are required in properly selected localities, where any one bringing samples may have them tested at a fixed rate of charge.

(c). Some of these should be combined with experimental stations, where experiments on a larger scale can be conducted under proper direction, upon the qualities to be desired in material for particular purposes.

The arrangement of certain details was entrusted to the technical committee of the union, who, in November, 1876, nominated a sub-committee on the classification of iron and steel, to whom the further investigation of the subject was relegated. This sub-committee, which consisted of Messrs. Wohler, Funk, Brockmann, Hornbostel, Stamble, Mahler, Bender, Lockner, Nowotny and Von Becker, in December, 1877, presented a report to the various governments interested, containing much valuable information. The sub-committee are of opinion that the disputes and complaints between contractors and consumers of railway plant are due in great part to the circumstance that the quality of the articles is not as exactly specified as the quantity. For example, in the case of articles to be delivered by weight or measure, it is certain, as a natural consequence, that the delivery would be made upon the smallest exact unit of the kind, and in like manner, when the quality is not accurately specified, the most cheaply-produced article, and therefore the lowest quality, would be supplied, and those who did not conform to this practice would be excluded from the competition.

The iron and steel industry is at present in such a position that the State must call upon it to find means to remedy the numerous deficiencies affecting its production. What these necessities are, and to what extent they occur, will be seen from the following figures, taken from the tables containing the results of the numerous experiments made on the tensile strength of materials:

	Absolute strength varied between kilograms per square centimeter (0.0015 ton per square inch).	Per cent.
(a) Bessemer steel.....	4,350 and 7,750	4 and 50.5
(b) Crucible cast steel.....	4,750 " 8,000	4 " 47.0
(c) Boiler-plate, longitudinal.....	4,020 " 4,100	5 " 34.0
(d) Bar iron.....	3,210 " 4,070	0 " 44.0

This irregularity between nominally similar materials, which may be taken as synonymous with want of safety in use, is found not only when the products of different works are compared, but even among samples of the same kind from the same works, while, on the other hand, the uniformity of the products from a certain small number of establishments, shows that the attainment of such regularity of quality is quite possible.

Testing stations should be combined with weights and measures, gauging offices, or technical educational institutions; the number and position of such stations can only be found by experience. As the introduction of the methods of describing quality by the co-efficients of tensile strength and malleability, as used by scientifically trained technologists, into commerce could only be done with difficulty, and might lead to such misunderstandings as would be likely to bring the whole purpose of the scheme into disrepute, it appears best to adopt a simple classification of the metals, based upon the adoption of certain minimum limits of tenacity and toughness. These limits should be so adapted as to be capable of revision from time to time, as improvements in the manufacture may require.

For present purposes the following appear to be proper values:

(a) BESSEMER STEEL, CAST STEEL, MARTIN STEEL AND CONSTRUCTIVE MATERIAL—E. G., FOR RAILS, AXLES, TIRES, ETC.

First Quality with Three Subheads.

Minimum breaking strain in kilograms per square centimeter, ton per square inch..... 0.0035

(a) Hard..... 5,500 (b) Medium..... 4,500 (c) Soft..... 4,000

Minimum contraction of area at fracture:

25 per cent. 35 per cent. 45 per cent.

In order to satisfy this quality the above figures must be attained or exceeded. The appearance of the fracture must be uniform and free from either longitudinal or transverse cracks.

Second Quality with Two Subheads.

Minimum breaking load..... (a) Harder..... 5,000 (b) Softer..... 4,500

Minimum contraction, per cent..... 25 30

(b) MALLEABLE IRON.

First quality. Second quality.

Minimum breaking strain..... 3,800 3,500

Minimum contraction, per cent..... 40 25

(c) IRON PLATES.

First quality. Second quality.

Minimum breaking strain..... 3,500 3,200

(a) with the grain..... 25 25

Minimum breaking strain..... 3,200 3,000

(b) across the grain..... 15 15

Minimum contraction, per cent..... 15 10

Materials of lower tenacity or ductility than defined by the above limits should not be admitted to classification, but the exclusion of unclassified material from trade would not be desirable. It would be sufficient to make the possibility of any one obtaining any desired quality a certainty.

Entirely distinct from the determination of the properties of a given material is the question of what these qualities should be for material destined to any particular use, as, for example, in the construction of boilers, &c. This is a matter for which the establishment of experimental stations would be desirable, and of these, two would be sufficient for the requirements of the German-Austrian Railway Union. They should be established at different places, and each would control and supplement the work of the other, their main object being to tell the producer what he should produce, but not how he should produce it.

The propositions put forward in the report are based upon the results of experiments made in the mechanical technical laboratory of the Munich Polytechnic High School, under the direction of Prof. Bauschinger, between November, 1876, and May, 1877. At the general meeting at the Hague, in July, 1877, it was resolved to carry on these experiments, combining them with the data obtained from actual use, in order to obtain data as to the conditions to be inserted in specifications for new material. In furtherance of this object, the experiments were continued until June, 1878, embracing in all:

Samples cast (crucible and Bessemer) steel for axles..... 120

Samples cast (crucible and Bessemer) steel for tires..... 120

Samples cast (crucible and Bessemer) steel for rails..... 120

Samples cast bar iron..... 120

Samples cast boiler plate, longitudinal..... 120

Samples cast boiler plate, transverse..... 120

Total..... 1,080

The test pieces were uniformly 400 millimeters (15.75 inches) long, and 25 millimeters (0.945 inch) broad. The experiments were made with one of Werder's testing machines, the constants of elasticity being obtained with Bauschinger's reflecting apparatus.

The results are exhibited in a series of tables, and illustrated graphically on four plates. In addition to the above, experimental results were communicated to the commission from eight independent parties. Experiment shows that, when the breaking strain in kilograms per square centimeter is taken as the measure of tensile strength, and the percentage contraction of area as that of malleability, the sum of those qualities fairly expresses the quality of the material. The question as to quality of material best for any special purposes is yet to be solved. This may be done either by experiment, or from results of experience on a large scale. The first of these methods is intended to be carried out in the experimental stations, whose establishments by the different governments is recommended as desirable by the commission, and although this commission has as yet produced no decided result, the propriety of founding the stations has been generally recognized. The second method, that of experience on the large scale, is within the province of the commission, and carefully compiled statistics of the conditions of rails and tires, combined with careful testing, would doubtless in no very long period give results of great value. Although, therefore, the commission does not consider its experimental researches as complete, it is thought that the general conditions of quality necessary for specification of axles, tires and rails may be laid down on the terms adopted at a general meeting held at Salzburg in May, 1879, viz.:

CAST STEEL AXLES.

Minimum strength, kilograms per square millimeter..... 10

Maximum contraction, per cent..... 30

Sum of both to be not less than 90.

These are to be so understood that a strength of 50 kilograms, with a contraction of 40 per cent., or of 60 kilograms and 30 per cent., or intermediate numbers in proportion, may be considered as equivalent.

CAST STEEL TIRES.

For locomotive wheels not subjected to action of brakes, minimum strength, kilograms per square millimeter..... 60

Minimum contraction, per cent..... 25

FOR TENDER AND CARRIAGE WHEELS.

Minimum strength, kilograms per square millimeter..... 45

Minimum contraction, per cent..... 25

STEEL RAILS.

Minimum strength, kilograms per square millimeter..... 53

Minimum contraction, per cent..... 25

Minimum sum of both..... 85

The limits of variation in all factors to be allowable in regard to axles and tires depend upon local conditions, as heretofore.

For rails the permissible limits might be so varied that a minimum strength of 65 kilograms, with a minimum contraction of area of 20, would be accepted as synonymous with 50 kilograms and 35 per cent., and the same for intermediate qualities.

The tests to be made upon pieces shaped to a uniform size and section. While breaking tests are essentially prescribed, the railway authorities reserve the right of making impact, flexure and transverse loading tests, as before.

MALLEABLE IRON BOILER PLATES.

(a) In the direction of rolling:

Minimum strength, kilograms per square centimeter..... 3,400

Minimum extension after fracture, per cent. of the original length, as measured on a length of 25 millimeters (1.94 inches), including the fracture..... 12

(b) At right angles to the direction of rolling:

Minimum strength, kilograms per square centimeter..... 3,000

Minimum extension, per cent..... 8

In conclusion, it may be stated that the Prussian Ministry of Public Works have, since July, 1880, adopted the above quantities as standard for specification of materials.

RUSSELL & ERWIN MANUFACTURING COMPANY,

New Britain, Conn., U. S. A.

**Manufacturers of BUILDERS' AND OTHER HARDWARE,
IRON AND BRASS WOOD AND MACHINE SCREWS.**

MANUFACTURERS' AGENTS AND DEALERS IN GENERAL HARDWARE AT OUR

WAREHOUSES: NEW YORK, 45 & 47 Chambers St.; PHILADELPHIA, 425 Market St.; BALTIMORE, 17 South Charles St.; LONDON, 47 Upper Thames St.



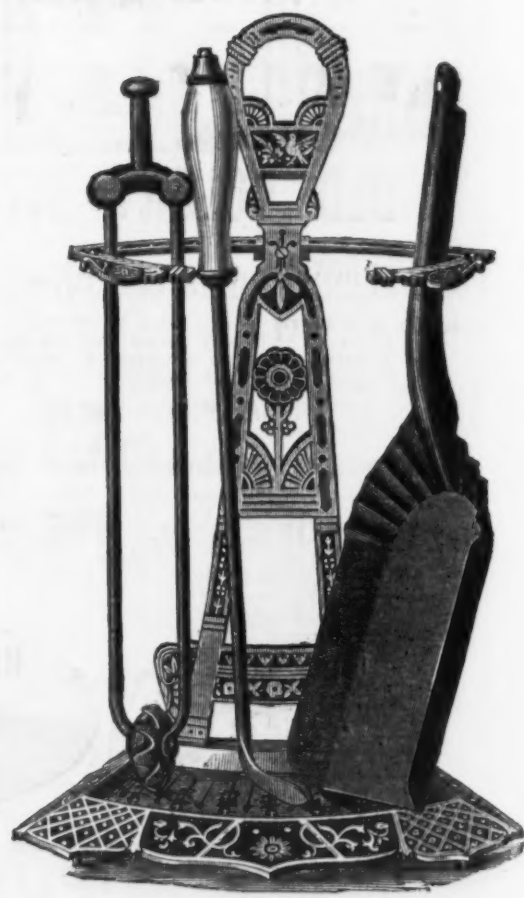
Stand No. 20.



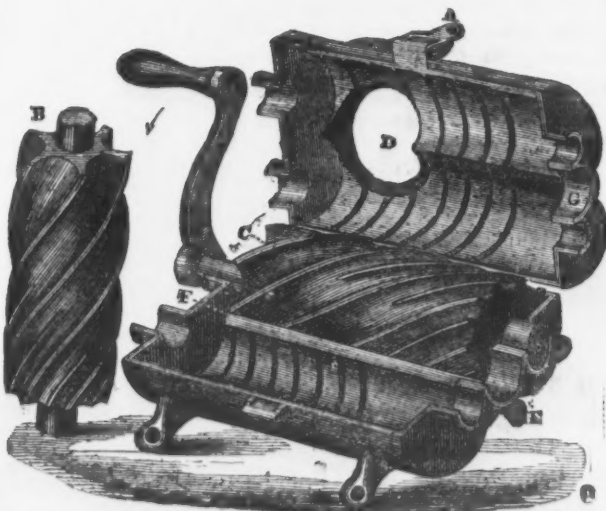
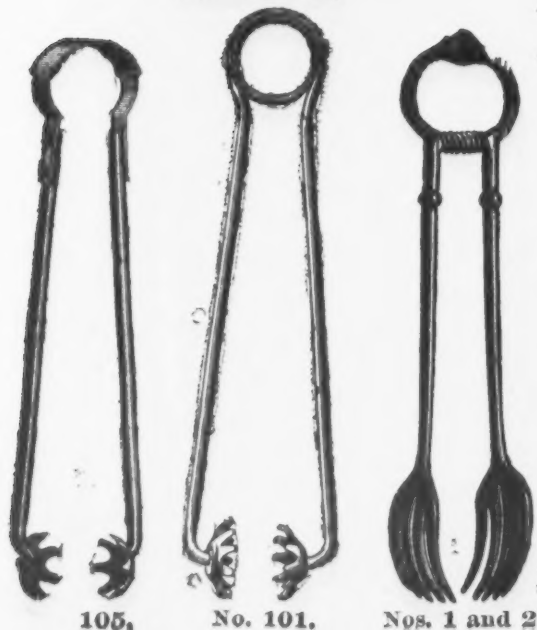
Stand Nos. 25 and 125.



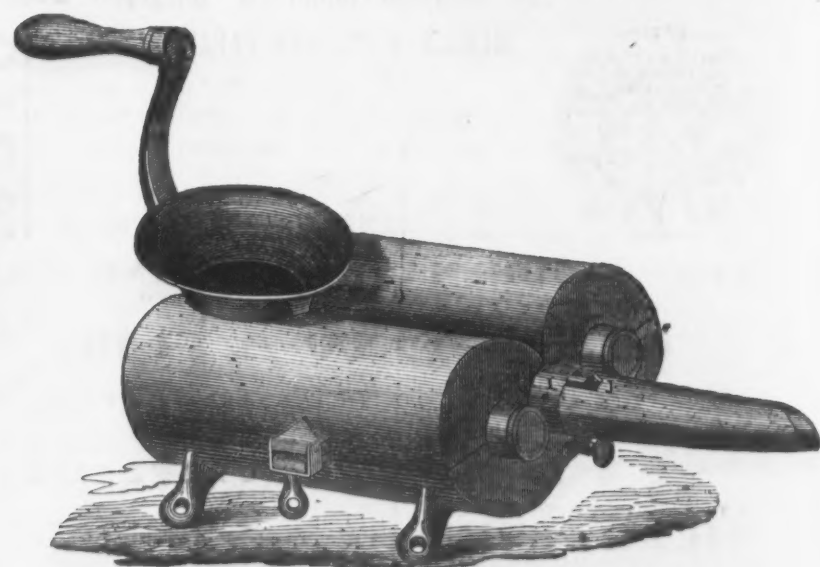
Stand No. 8021.



Kitchen Sets, No. 8000.



Hale's Patent Meat Cutter.—Open.



Hale's Patent Meat Cutter.—Closed.

GREENFIELD TOOL CO.,

(GREENFIELD CUTLERY CO.)

Greenfield, Mass., U. S. A.,

MANUFACTURERS OF

**Fine Table Cutlery.**

Solid Handled, Bone, Ivory, Rubber and Wood, Solid Steel Silver Plated.

**PATENT CONCAVE FORGED OX SHOES.**

Also, FLAT SHOES with

TWO CALKS at same price.

ALSO,

PLANES, PLANE IRONS, &c.**RICHARD DUDGEON,**

No. 24 Columbia Street, New York.

Maker and Patentee of the Improved

Hydraulic Jacks

AND

Punches.

Roller Tube Expanders and Direct Acting Steam Hammers.

Communications by letter will receive prompt attention.

Jacks for pressing on Car Wheels or Crank Pins made to order



Our specialty Also, Creatings, Finales and Vases, Stable Fixtures, Hitching Posts, Door and Window Guards Wrought-Iron Gratings, Fire Escapes and Ladders, Jails, &c. Our Fencing can be shipped to any part of the United States and can be set up by the purchaser at small expense. Our prices are reasonable. Correspondence and notice of public lettings of ironwork solicited. Every Hardware Dealer should have our Catalogue. Address

CLEVELAND WROUGHT IRON FENCE WORKS,
Office, 21 Water Street, near Union Depot, CLEVELAND, OHIO.

BRASS FOUNDERS

of the

SOUTH.

We have formed an agency for the sale of our goods in Richmond, Va., where they can be furnished at factory prices, saving time and freight. Every crucible shipped by us fully guaranteed. Please remember that the quality of our goods is not equaled by any other maker. Send your orders to

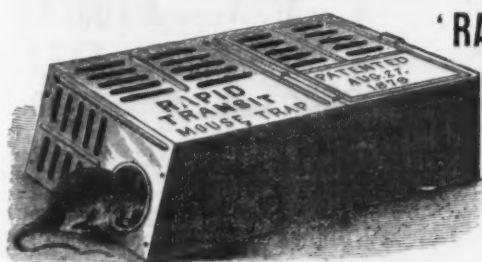
ASA SNYDER,1008 Carey Street,
RICHMOND, VA.**CRUCIBLES**

FOR

German Silver, Brass and Steel.

Black Lead Stoppers and Nozzles.**Jewelers' Crucibles,****Covers, Dips, &c.****FILE HARDENERS.**

All our goods are made of the finest Ceylon Flumbugo.

W. T. MACFARLANE,
Treasurer and Agent.

Patented August 27, 1878.

Manufactured by

THE SMITH & EGGE MANUFACTURING CO., Bridgeport Conn.**MERIAM & MORGAN PARAFFINE CO.,**
Cleveland, Ohio.**THE BEST GREASE**

For all kinds of

Wagons, Threshers, Cog Gearing,

Heavy Bearings, &c.

Our Paragon Show Card

mailed on application.

NEW YORK, 143 Front St.,

BOSTON, 32 Oliver St.,

CHICAGO, FERRIS & AVERY,

Agents, 48 No. Wells St.

THE GLOBE MANUFACTURING CO.,
Successors to THE MIDDLETOWN TOOL CO.**HARDWARE,**

INCLUDING IN GREAT VARIETY THE WELL-KNOWN

"Baldwin" Plane Irons.

(Every Iron of our make warranted a perfect cutter.) ALSO,

Galvanized Hammock or Boat Snaps and Gaff Topsail Self-mousing Ship Hooks, Har-

ness Snaps, Baby Snaps, Washer Cutters, Pocket Wrenches, Amateur Lathes, &c.

MIDDLETOWN, CONN.

Send for Catalogue and Discount Sheet.

THE COMBINATION**IRON CLAD STEEL HORSE SHOE CO.,**
SELF WELDING STEEL TIRE CO.,
BILLET AND WIRE CO.,

Sole and exclusive manufacturers of "Wheeler's Combination" Shoes, Shoe Bars and Toe Calks. Tire and Wire. Full particulars upon application by mail or otherwise to WARE B. GAY, Treasurer, 60 State Street, Boston, Mass. All persons cautioned against infringements.

The Iron-Masters' LABORATORY.

Exclusively for the
Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestones, Clays, Slags and Coal for Practical Metallurgical Purposes.

No. 339 Walnut St., Philadelphia.
With Branch at Warrenton, Virginia,
J. BLODGET BRITTON.

This laboratory was established in 1866, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes. The object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

CHARGES TO IRON WORKS.

For determining the per cent. of Pure Iron in an ordinary sample of Pure Iron, Sulphur and Phosphorus in do. \$4.00
For each additional constituent of usual occurrence. 12.50
For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances. 1.50
For determining the per cent. of Sulphur or Phosphorus in Iron or Steel. 7.00
For each additional constituent of usual occurrence. 6.00
For the per cent. of Carbonate of Lime, and Insoluble Silicious Matter in a Limestone. 10.00
or each additional constituent. 2.00
or the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal. 12.50
For determining the constituents of a Clay, Slag, Coke, or of an Ash in Coal the charges will correspond with those for the constituents of an ore.
For a written opinion or letter of instruction the charge must necessarily depend upon circumstances.
Printed instructions for obtaining proper average samples for analysis furnished upon application

PHOSPHOR-BRONZE!**PHOSPHOR-TIN!**

Phosphor-Bronze is daily gaining favor with manufacturers who have to use a metal of great toughness and durability, of fine grain, high tensile strength and ductility, and is acknowledged far superior to any other alloy on account of the readiness with which it takes a polish, its elasticity, fluidity and beauty of color. Its high price, however, has so far prevented the use of it to so large an extent as its merit would warrant. For the first time an article is offered herewith which makes it easy for everybody to manufacture his own Phosphor-Bronze of the grade it is wanted, by the simple process of melting. This article is **PHOSPHOR-TIN**. By melting a very small quantity of it with copper an excellent Phosphor-Bronze is obtained at a much cheaper price than the ready made Phosphor-Bronze can be had in the market. A trial ought to be made by everybody who is using it.

A. KAUFMANN, 36 Park Place, New York,
Sole Agent for the United States and Canada.
For pamphlets please address the above, P. O. Box 2110, New York.

Bergen Port Spelter.

MINES: WORKS & FURNACES:
Lehigh Valley, Pa. Bergen Port, N. J.
The only Miners and Manufacturers of

PURE LEHIGH SPELTER

From Lehigh Ore.

Especially adapted for

Cartridge Metal and German Silver.

Also manufacturers of

BERGEN PORT OXIDE ZINC.

Superior for LIQUID PAINT on account of its body and wearing properties.

BERGEN PORT ZINC CO.**E. A. FISHER, Agent, 13 Burling Slip, N. Y.**

DAVID ROUND

HAND MADE COIL

CABLE & BLOCK

CHAINS.

CLEVELAND, O.

SEND FOR PRICES.

BLACKSMITHS' FORGES

(Patterson's Patent).

Portable or stationary, superior to stone or brick.

Can be used with bellows or fan. Send for information to the

FORGE COMPANY,

Brooklyn, E. D., N. Y.

THOMAS S. SMITH,**PERFORATED SHEET IRON,**

Steel, Brass and Zinc

For all their various uses.

Screens for Ores and Coals, Wheat,

Corn and Smut.

Also, Malt Kilns, Coffee Roasters, &c. All sizes of

Nuts, Washers and Chain Links and General Black-

smithing. 137 & 139 E. Pearl St.,

Send for Price List. CINCINNATI, O.

Established 1838.

Bevin Bros. Mfg.

Co.,

Easthampton, Ct.

Manufacturers of

SLEIGH BELLS,

House, Tea, Hand,

Gong Bells, &c.

Bell Metal Kettles.

JOHN STARR,**Hardware & Metal Broker,**

AND

MANUFACTURERS' AGENT,

Halifax, Nova Scotia,

Representing in the Dominion of Canada several

American Manufacturers, is ready to accept

further Agencies. Satisfactory references.

rials for the State Railway Department, as have also the larger number of the German and Austrian railways forming part of the union. Those among the steel manufacturers who at first were strongly opposed to these conditions have also generally signified their acquiescence.—*Transactions of the Institution of Civil Engineers.*

METALLURGICAL NOTES.**WELDLESS RING PLATES FOR BOILERS.**

Mr. J. Windle, formerly with Messrs. Bessemer, of Sheffield, and late of the Railway Steel Plant Works, Manchester, has just designed and patented a mill to roll weldless ring plates for boilers, from 2 feet diameter up to 14 feet, and 4 feet wide. The object of the invention is to avoid the longitudinal seams in boilers, which are necessarily a source of weakness, and this is accomplished by constructing the shell of the boiler of metal rings connected together, and formed by a rolling operation from an ingot of steel, or from a bloom or mass of metal in a similar manner as when rolling railway tires, the ring being formed without a joint, seam or weld. In the rolling mill, which has been specially designed for this work, a fixed and a movable roller, adapted to roll the required rings, are employed. The axes of these rollers are provided with top bearings, and to enable the ingot ring or mass of metal to be placed in position, and the rolled ring to be removed, the upper bearing of the movable roller is arranged to be withdrawn. This bearing is fixed on the outer end of a lever or lever-frame, which is hinged to a sliding standard or carriage, connected with the carriage which carries the movable roller, the sliding standard being actuated by means of hydraulic cylinders. Vibrating frames are also employed, each carrying two, three, or more rollers in place of one, the upper ends of the studs and shafts being stayed. A number of the carrying rollers are connected, by means of bevel or suitable gearing, with revolving shafts, so that they assist in the carrying round of the ring. In carrying out this method of rolling, a hole is punched in the ingot or bloom, and a mandrel introduced. The mass of metal with the mandrel in position is then placed under a steam hammer on a swage, which is formed to confine the metal sideways, so as to produce an extension of the length under the blows of the hammer until a rough cylinder of sufficient length is obtained, but in some cases the ingot is cast in the form of a hollow cylinder, which, when necessary, is elongated in the manner above indicated. These ring plates can be produced in any required shape, and with flanged or thickened edges if necessary, and we understand that a company is being formed to put down the necessary plant for the manufacture of boilers and plates on this principle.

THE LAUTH THREE-HIGH MILL IN EUROPE.

The Lauth three-high mill for rolling sheet iron or steel and plates is rapidly gaining in favor in Germany, Belgium and France. In the beginning, as Daalen reports in the *Zeitschrift des Vereins Deutscher Ingenieure*, some trouble was experienced by reason of the fact that the middle roll wore rapidly. This was caused by the adhesion of cinder to the roll, and its being passed through over and over again. This has been done away with by suitable stripping devices. Krupp has built a sheet mill for steel, having 26.4-inch top and bottom rolls and 15.2-inch middle roll, the maximum thickness of plates entering the rolls being 0.5-inch. In turning out 0.06-inch sheets, the engine makes 60 revolutions; it makes 50 for 0.04-inch sheets, 40 for 0.03-inch sheets; and 30 revolutions below that gauge. The engine has an automatic Corliss gear, a 37.6-inch cylinder, and 62.80-inch stroke. A Lauth three-high plate train at the same works has 35.6-inch top and bottom rolls, and a steel 17.80-inch middle roll, which is raised and lowered mechanically before every pass. The mill is run at the rate of 49 to 60 revolutions per minute.

HEATING METALLURGICAL FURNACES WITH COAL DUST.

An apparatus by which coal dust and other pulverized fuel can be efficiently and economically utilized for the heating of metallurgical and certain other furnaces, has been invented by Mr. G. M. Thomson, of Paris. The apparatus in question is composed of a hopper, through which the pulverized fuel falls upon a horizontal shaft provided with worms or screw blades working in opposite directions from the center, the said shaft being operated by any convenient motor. By these worms the fuel is carried into funnels beneath each end of the hopper, whence it falls into air pipes, in which, after being thoroughly mixed with atmospheric air, it is blown into a combustion chamber, where it is instantaneously ignited and entirely consumed. The amount of air required to effect perfect combustion is regulated by suitable registers, and the admission of the fuel is controlled by a pulley set on the worm shaft, the uniformity of the feed being secured by agitators set upon a longitudinal shaft, which, passing through the hopper from end to end, is rotated by suitable gearing. The form, dimensions and general details of construction of the apparatus may be varied according to its intended application.

THE IRON ORES OF IRELAND.

Some highly interesting "Notes on the Tertiary Iron Ore Measures, Glenariff Valley, County Antrim," have been recently read before the Royal Dublin Society by Mr. Philip Argall, and these have now been printed separately in pamphlet form. He considers that the true nature of the iron ore deposits as still to be learned. In connection with the Glenariff district he has never found the ore of the same quantity and quality on both sides of a dyke, and from what he can learn the same thing occurs in other mines; as a rule, a good seam occurs on one side only, which is generally the east side. To him this appears important, as a similar phenomenon is found in standing mineral veins when the dykes or cross-courses appeared to act as a stop to the filling material. Thus, in the case of the pisolitic ore seam, it would appear that the dykes which stopped at the roof acted as a sort of stop for the material which constitutes the ore seam. The pisolitic ore is neither baked nor dis-

placed by the majority of dykes which stop at the roof, while nearly invariably it is displaced and indurated by the dykes which penetrate the roof, from which it would appear that the pisolitic ore was formed prior to the latter and subsequent to the former. Yet the relation between the iron ore and the lignite would suggest the accumulation to be lacustrine. But, on the other hand, the pisolitic iron seam is not of even thickness, and is often absent over large areas, also its thickening on one side of a dyke and not at the other; the pisolitic structure being well developed in one place and scarcely discernible in another, and the largest pisolites being always found next the roof, decreasing both in size and number as we descend from it, are facts difficult to explain in a lake deposit. As, however, none of the eminent authorities who have written on these horizontal seams have put forward a theory that satisfactorily accounts for those peculiarities in their accumulation, it would, he considers, be presumption in him to do so. The paper is readable and instructive, and reflects much credit upon the author.

A NEW ROTARY STAMP MILL.

A new rotary stamp mill, the invention of Mr. J. M. Stuart, a Canadian, has been in operation in London, and both from the manner in which it does its work, and from the favorable opinion expressed with regard to it by practical men, it is not doubted that it will prove effective in the treatment of the gold ores. The new mill consists of a series of conical rollers, kept in motion by a rotating plate formed of a series of inclined planes, so that the ore is subjected to a crushing action while the roller moves along the plane, followed by a sharp stamp-like blow as it passes from one plane to another. In this way a large quantity of work is done with very little power; every particle of ore is brought into contact with the mercury, which, however, is protected from the grinding action, and all the free gold contained is taken out. The mill is simple, and not liable to get out of repair. It can be put up in 24 hours. The ore is amalgamated by one operation, with small loss of quicksilver, which is not liable to triturate. It is claimed that it is only one-half the price of the usual mill, and does its work better. The parts are very few, being, in fact, only the cylinder or battery upon which the false bottom revolves, the five conical stamps placed upon it, and which are moved by the plate, revolving in an opposite direction, and the very simple gearing which completes the whole. All the available portions of the mill are crushing at one time, so that the utmost speed is obtained, and as it is on the principle of a Mexican arrastra, which is no doubt the best and least expensive mode of obtaining gold, its success is guaranteed by the inventor. It should be seen by all contemplating the erection of machinery, and as the heaviest part need not exceed 5 cwt., it will be valuable in many places beyond the reach of other machinery.

FUEL CONSUMPTION IN THE MANUFACTURE OF PIG IRON.

Messrs. Taws & Hartman, of Philadelphia, have furnished the secretary of the American Iron and Steel Association the following note for publication: "Referring to column 9 of the tabular statement of fuel consumption published in the *Bulletin* of the 21st inst., we write to say that we have just received the data of six consecutive weeks of best running by the furnaces alluded to in that column, as follows:

	Pounds.
Coke used to ton of pig iron.	2,490
Iron ore used to ton of pig iron.	2,492
Limestone used to ton of pig iron.	3,339

No. 1 Bessemer pig iron was the sole product, and the average output for the six weeks was 1274½ tons of 2268 pounds."

A NEW COKE FOR THE PRODUCTION OF MANGANEFEROUS PIG IRON.

M. Alphonse Jaumain, of Belgium, describes a process of making manganiferous iron suitable for conversion by the Thomas-Gilchrist process. It consists in making and using in the blast-furnace cupola or other smelting furnace, a coke containing a quantity of the oxides of manganese or ores containing this metal. The manganiferous ores are intimately mixed with the coal intended to be made into coke. If the coal and the ore are in small enough pieces, they can be mixed in specified proportions before pulverizing, or in the pulverizer itself, or in the charging barrows. If the ore is in lumps it should be first pulverized, so as to have the quantity of manganese divided as equally as possible throughout the mass; the coal is then coked in intimate contact with the manganese. If it is desired to produce in the blast furnace a manganiferous pig iron containing 1 per cent. of manganese, with a consumption of 1200 kilos. of coke for the ton of pig (when obtaining a reduction of 90 per cent. of the total quantity of manganese), it is necessary to add to the coke 11 kilos. of manganese, or for each 1000 kilos. of coke 9½ kilos. of manganese; that is to say, if a rich manganiferous ore (containing 50 per cent. of metallic manganese) is employed, he uses for each ton of coke 19½ kilos. of said ore. When the coal yields 75 per cent. in the coke ovens, he employs 14 kilos. 6 grams of the said ore. The coal should be of the best quality, so as to diminish, as far as possible, the production of coke ashes. It should be clean and have great power of agglomeration. If it is desired to introduce the manganese into the pig iron while treating the same in the cupola, he melts the iron with manganiferous coke. The consumption of coke in the cupola being 200 kilos. for the ton of pig, and it being desired to introduce 1 per cent. of manganese in the smelted metal, he uses a coke containing 3.55 per cent. of manganese. It is claimed that the process may be most advantageously employed in treating iron intended for subsequent conversion by the Thomas-Gilchrist process, being equally applicable whether the metal is run direct from the blast furnace or is remelted in the cupola. The manganese being calcined at the same time that the coal is coked, it loses a considerable portion of its oxygen, and this is an advantage in its ultimate reduction.

BY-PRODUCTS FROM THE CINDER OF THE BASIC PROCESS.

A German patent has lately been issued for the utilization of the valuable constitu-

H. D. SMITH & CO.,

Plantville, Conn.,

Manufacturers of the

BEST QUALITY CARRIAGE MAKERS' HARDWARE.

Manufacture the Largest Variety of Forged Carriage Irons of Best Material and Workmanship.

PRICES LOW FOR QUALITY OF WORK FURNISHED.

SEND FOR PRICE LIST.

SARANAC HORSE NAIL CO.

Polished or Blued Horse Nails, Hammered and Finished.

The Saranac Nails are hammered hot and the finishing and pointing are done cold. Quality is fully guaranteed. For sale by all leading iron and hardware houses.

S. P. BOWEN, President and Treasurer.

PLATTSBURG, N. Y.

W. S. GUIBORD, Secretary.

ELY & WILLIAMS, Gen'l Agents for Eastern and Middle States, 1232 Market St., Philadelphia; 178½ Water St., New York; 36 Oliver Street, Boston. S. H. & E. Y MOORE, Gen'l Agents for Western States, 163 and 165 Lake Street, Chicago, Ill.

SAM'L G. B. COOK & CO. Agents for Southern States, Nos. 67 and 69 (old Nos. 5 and 7) German Street, Baltimore, Md.

SARANAC HORSE NAILS,

Blued or Polished.

Terms, Cash, within 60 Days.

Nos. 5 6 7 8 9 10

Cts. 26 23 21 20 19 18

AGENTS FOR

W. & C. Scott & Son's,

J. P. Clabrough & Bros.'

C. G. Bonehill's

BREECH LOADING GUNS.



COLT'S

PARKER'S and

REMINGTON'S

BREECH LOADING GUNS.

HARTLEY & GRAHAM,

Post Office Box 1760.

NEW YORK.

17 and 19 Maiden Lane.

Importers and Jobbers,
AMERICAN BREECH LOADING
ENGLISH " "
BELGIAN " "

GUNS

CHEAPEST AND BEST GRADES.
ENGLISH MUZZLE LOADING
BELGIAN " "
FLOBERT RIFLES, Plain and Remington System.

BRITISH BULL DOG REVOLVERS, 38, 44 and 45 Calibre.

Agents for COLT'S and ROBIN HOOD line of REVOLVERS, BRIDGEPORT GUN IMPLEMENT CO.'S GOODS, UNION METALLIC CARTRIDGE CO.



WM. ESTERBROOK,

Wholesale Manufacturer of

Coal Hods,

311 Cherry St., PHILADELPHIA.

COBB & DREW

Plymouth, Mass.,

Manufacturers of Copper, Brass and Iron Rivets; Common and Swedes Iron, Leathered, Carpet, Lace and Gimp Tacks; Finishing, Hungarian, Trunk, Clout and Cigar Box Nails, &c. Rivets made to order.

NEW YORK AGENCY,

GRUNDY & DISOSWAY,

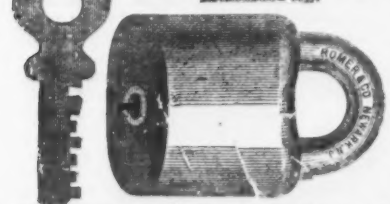
HARDWARE,

165 GREENWICH STREET.

Agents for the Philadelphia Star Carriage and Tire Belts.

Romer & Co.

Established 1837.



Manufacturers of Patent Scandinavian or Jail Locks, Brass Pad Locks for Railroads and Switches. Also Patent Stationary R. R. Car Door Locks. HANDCUFFS AND LANTERNS.

145 to 147 Railroad Avenue, Newark, N. J. Illustrated Catalogue sent to the trade on application.

AXLES

All kinds Waggon & Carriage Axles
Manufactured by the
LANCASTER IRON WORKS.
Lancaster, N. J. Send for prices.

The Boss Lemon Squeezer.

Malleable Iron and

Tinned (pure Tin).

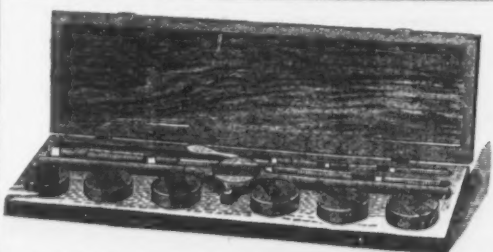


Acknowledged the Best.

Patent Applied For.

JOHN J. TOWER, 96 Chambers St., New York.

ORDER EARLY.



LITTLE GIANT
SCREW PLATES

MADE BY
WELLS BROS. & CO.,

Greenfield, Mass.,
Manufacturers of Taps, Dies, Taper Reamers, Bolt Cutters (hand or power), Samson Tire Shrinker, Tire Bender, Foot Vise and other Blacksmiths' and Carriage Makers' Improved Tools. Send for prices and Illustrated Catalogue.

CHAMPION

HOG RINGER

RINGS and HOLDER.

Only double Ringer ever invented. The only Ring that will effectively keep Hogs from rooting. No sharp points in the nose.



EAGLE BILL

CORN HUSKER

is the best Husker in the market. Farmers say it is the best. Use no other.



BROWN'S

HOG AND PIC

RINGER and RINGS.

Only single Ring to the market that closes on the outside of the nose. No sharp points in the nose to keep it sore.

MINERS' CANDLES.

Superior to any other Light for Mining

Purposes. Manufactured by

JAMES BOYD'S SON,

Nos. 10 & 12 Franklin St., New York.



GEO. M. EDDY & CO.,

Manufacturers of

Measuring Tapes

Of Cotton, Linen & Steel.

ALL PURPOSES.

251 to 263 Nassau Ave., Brooklyn N. Y.



Bemis & Call Hardware & Tool Co.

PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, case-hardened throughout, and not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite combinations of a regular Nut Wrench, thus making a combination which has no equal.

For Circulars and Price List, address

BEMIS & CALL HARDWARE & TOOL CO., Springfield, Mass.

BROWER & LEEDS,

Hardware Manufacturers' Agents,

81 Murray Street, NEW YORK,

Headquarters for

Burden's Horse and Mule Shoes,

Perkins' Horse, Mule and Snow Shoes,

Sweet's Toe Calks and Calking Steel.

All Leading Brands of Horse Nails.



THE BUTLER DOOR AND GATE SPRING.

Adjustable, Reversible, Self-locking. Has no Loose Piece. Needs no Wrench. Acknowledged the Simplest and Best Made.



BUTLER DOOR SPRING CO., Cleveland, Ohio.

BROWER & LEEDS, 81 Murray St., New York Agents.

HORACE F. SISE 100 Chambers St.,

THE "BOSS" SCYTHE RIFLE.

Warranted not to scale or glass. Impervious to water, and not affected by heat. It is the best Rifle now offered.

LEVI L. BROOKS, Manufacturer.

IRVINE, TOWNSEND & CO., Sole Agents, 123 Chambers Street, New York.



SPENCER & UNDERHILL,

94 Chambers St., New York, Agents for
American Screw Co.'s Wood Machine and
Rail Screws, Store and Tire Bolts, Rivets, &c.
G. F. Warner & Co.'s Carriage Clamps.

DEPOT FOR

O. Ames & Son's Shovels, Spades and Scoops.
A. Field & Son's Tacks, Brads, Nails, &c.
Nicholson File Co.'s Files and Rasps.
W. & S. Hatcher's Chisels, Gouges, Plane
Irons and Cleavers.
E. W. Gilmore & Co.'s Strap and T Hinges.
Russell Jennings' Auger and Dowel Bits.
Also a general assortment of Hardware.



Is attached to the Sash easily, without in the
least weakening or defacing it. No holes to be
cut in casing, no attachments thereto, no abra-
sion no matter how long used, nor how severely.
Is never out of order. Address

Universal Sash-Lock Co.,

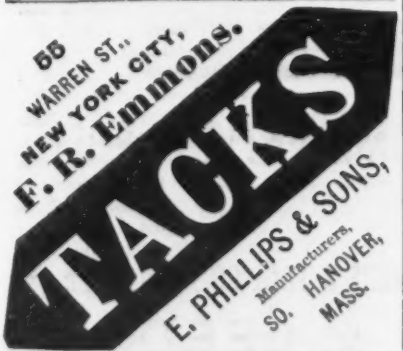
S. W. corner Hamilton and Liberty Streets,
ALBANY, N. Y.

N. Y. MALLET and HANDLE WORKS



Manufacturers of
Calkers', Carpenters', Stone Cutters',
Tin, Copper and Boiler Makers'
MALLETS,
Hawking Beetsles, Hawking and Calking Irons;
also all kinds of Handles, Sledge, Chisel and Hammer
Handle &c. Also

COTTON and RALE HOOKS.
Patented Feb. 13, 1877; a new combination of Hooks.
456 E. Houston St., New York City.

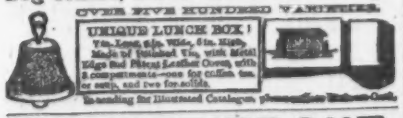


Medford Fancy Goods Co.,

90 DUANE STREET NEW YORK



Dog Collars, Blankets, and Furnishings.



W. & J. TIEBOUT,

Manufacturers of

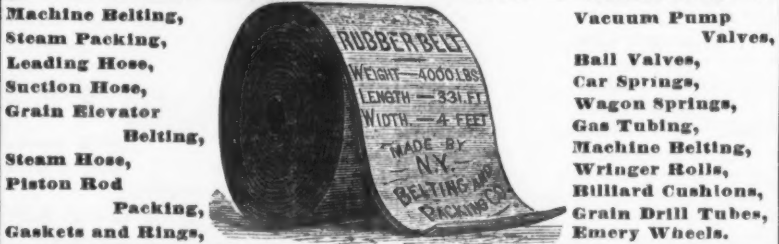
Brass, Galvanized & Ship

Chandlery Hardware,

No. 33 Chambers St., New York.

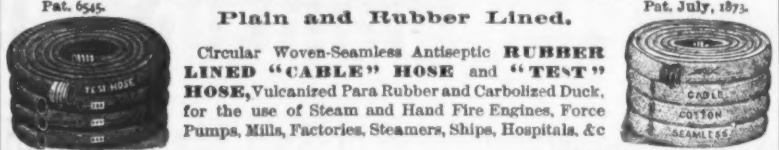
Vulcanized Rubber Fabrics

ADAPTED TO
MECHANICAL PURPOSES.
RUBBER BELTING and PACKING.



This company manufactured the immense DRIVING and ELEVATOR BELTS for the Buckingham
Elevators at Chicago, which have been running perfectly for more than Twelve Years, also those for
Armour, Dole & Co., Chicago, and Vanderbilt's great elevators of the New York Central and Hudson R.
R., New York, being the Largest Belts in the World! We are now making an Elevator Belt 36
inches wide and 2,500 feet in length, which will weigh over 18,000 pounds.

LINEN and COTTON HOSE.



Pat. 6545. Circular Woven-Seamless Antiseptic **RUBBER**
LINED "CABLE" HOSE and "TEST"
HOSE, Vulcanized Para Rubber and Carbolized Duck,
for the use of Steam and Hand Fire Engines, Force
Pumps, Mills, Factories, Steamers, Ships, Hospitals, &c.

Emery Wheels and Packing.

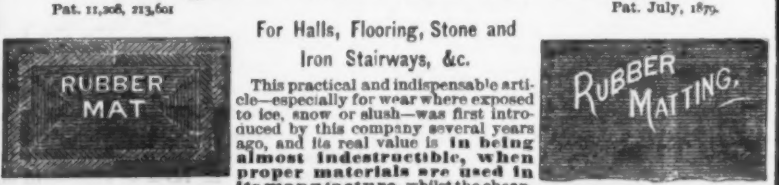


The properties of these Wheels are such that they can be used with great advantage and economy
for cutting grinding, and finishing Wrought and Cast Iron, Chilled Iron, Hardened Steel, Slate, Marble
Glass, etc. These Wheels are extensively used by manufacturers of Hardware, Cutlery, Edge Tools,
Plows, Saws, Stoves, Fire Arms, Wagon Springs, Axles, Skates, Agricultural Implements, and small
Machinery of almost every description.

PATENT ELASTIC Rubber Back Square Packing

For Packing the Piston Rods and Valve Stems of Steam Engines & Pumps
B represents that part of the packing which, when in use, is in contact with the Piston rod.
A the elastic back which keeps the part B against the rod with sufficient pressure to be steam tight
and yet creates but little friction.
This Packing is made in lengths of about 20 feet, and of all sizes from 1/4 to 2 inches square.

Corrugated Rubber Mats and Matting,



Inferior quality forced on the public by reckless imitations of our patent goods soon becomes brittle
and crumbles to pieces. Address

NEW YORK BELTING & PACKING CO.,
Warehouse, 37 and 38 Park Row, New York.
JOHN H. CHEEVER, Treasurer.

TACKS & NAILS.

CUT TACKS, SHOE NAILS, WIRE NAILS,
Pat. Brads, Finishing Nails, Clout Nails, Trunk Nails, Hungarian Nails,
Cigar-Box Nails, Basket Nails, 2d and 3d Fine Nails,
Carpet Tacks, Upholsterers' Tacks, Gimp and Lace Tacks, Brush
Tacks, Copper and Brass Tacks,
BRASS AND IRON ESCUTCHEON PINS, &c., &c.
MANUFACTURED BY
DUNBAR, HOBART & WHIDDEN, So. Abington Station, Mass.
New York Salesroom, 39 Warren St. Goods made to order from sample.
Particular attention given to orders for EXPORT.

PHOSPHOR-BRONZE.

The Phosphor-Bronze Smelting Co., Limited,



Owners of the U. S. Phosphor Bronze Patents. "Phosphor-Bronze." Sole Manufacturers of in the United States.

Office and Salesroom,
512 Arch Street, - - - PHILADELPHIA, PA.

THE STRONGEST, TOUGHEST,
BEST AND MOST DURABLE METAL.

PHOSPHOR BRONZE SPRING WIRE AND WIRE FOR WEAVING, &c.

Pump Rods, Tubes, Screws, Jack Chains,
Rolled Bolts, Nails, Wire Cloth, Sash Cords,
Sheets, Boat Nails, Pens, Wire Ropes,
Plates, Tacks, Sash Chains, Cast Kettles.

INGOTS FOR CASTING.

Send for Pamphlet and Price Lists.

PHOSPHOR-BRONZE.

ents of the cinder from the basic process. The object of the invention is to transform the product obtained by dissolving the cinder in hydrochloric acid and precipitating with lime into phosphate of soda and oxide of iron, by smelting it with sulphate of soda and carbon in the form of coal or coke, crude salt being added or not, as the circumstances may demand. The process, which, so far as we know, has not been carried out on a working scale, is to be conducted in the following way: The cinder, which may contain as much as 9.2 per cent. of phosphoric acid, is first ground in any suitable manner, and, in order to render this more easy, the cinder is dropped into water while still hot. When the quantity of granules of steel entangled in the cinder is large, they are separated by screening or with the aid of magnets. The crushed cinder is dissolved in hydrochloric acid in large vats, and the insoluble silicates formed are filtered off by means of a press or a centrifugal apparatus. The solution thus obtained is worked by one of two methods, the choice depending upon the quantity of manganese in solution. If it contains little manganese, so that it is not the intention to separate it, quicklime, or a mixture of it with magnesia, is added in such quantity that all the phosphoric acid is precipitated as phosphate of lime mixed with phosphate of magnesia, if that substance has been present. After filtration, the precipitate is dried and is intimately mixed with sulphate of soda in such quantities that there are at least three equivalents of soda for each equivalent of phosphoric acid. To this, powdered coke or coal is added, and the whole is exposed for several hours to a high temperature on the hearth of a furnace, care being taken that an excess of air is maintained for the purpose of having an oxidizing flame. As soon as the mass is fused, it is agitated by introducing into it a jet of air, or a mixture of air and steam. This blowing is continued until the reaction is completed, and nothing remains but oxide of iron and sulphate of soda. The fusion may be accelerated by the addition of sea salt. The sulphuric acid, or its mixture with chlorine or hydrochloric acid, or both, if formed, may be gathered and utilized. The fused mass drawn from the furnace is then washed with water until the phosphate of soda is entirely extracted and nothing remains behind but marketable oxide of iron. The solution is boiled down, and any sulphate of soda in it is separated by crystallization. Carbonate of soda or caustic soda may be used to replace the sulphate in the process. When the cinder holds so much manganese that it will pay to extract, the process is modified in the following manner: After dissolving the crushed cinder with hydrochloric acid, and filtering off the insoluble silicates, peroxide of manganese is added, with the object of oxidizing all the iron in the solution, which is then heated to boiling. Powdered chalk or dolomite is added in sufficient quantity nearly to neutralize the solution, and the boiling is continued until the phosphate of lime is precipitated. This is then worked in the manner already indicated, and the mixture of oxide of iron and manganese obtained is used after adding a little lime for precipitating.

FIG IRON MANUFACTURE AND FURNACE FUEL ECONOMY IN GREAT BRITAIN.

The 567 1/2 furnaces in operation in Great Britain in 1880 produced 7,749,223 tons of pig iron. Of the above furnaces 379 were in England, 76 in North and South Wales, and 112 1/2 in Scotland, the total quantity of coal used amounting to 16,682,629 tons. The production of 1879 was 5,995,337 tons; the coal employed in its manufacture was 13,117,411 tons. The total number of furnaces in blast in Great Britain, and the quantity of coal used in 1880 and previous years, appear in the annexed table:

Year.	No. of Furnaces.	Tons.	Pig Iron.	Coal used.
1876.....	585	6,555,997	15,593,381	15,593,381
1877.....	541	6,608,664	15,342,445	15,342,445
1878.....	498	6,381,051	14,112,003	14,112,003
1879.....	495	5,995,337	13,117,411	13,117,411
1880.....	567 1/2	7,749,223	16,682,629	16,682,629

The following table shows for the year 1880 the number of furnaces built and in blast in each iron-making district of Great Britain, the make of pig iron, the coal used, and the average yield per furnace, and of coal used per ton of iron made:

District.	Furnaces.	Pig Iron Made.	Coal Used.	Average.
England.....	379	5,925,643	12,021,442	13.180
North Wales.....	76	571,818	1,298,328	8.999
South Wales.....	112 1/2	1,390,766	3,062,858	13.070
Scotland.....	44 1/2	1,269,800	2,598,328	12.600
Total of United Kingdom.....	567 1/2	7,749,223	16,682,629	10.113

In Lancashire, Cleveland, Durham and Lincolnshire the quantity of coal used per ton of iron varies from 38 to 46 cwt., the coke employed being of the best hard dense variety obtained from the Durham coal field. In the West Riding of Yorkshire, where cold blast is largely employed, 50 cwt. is the average, while in Scotland, where raw coal is extensively used, the average is 50 cwt., and in Shropshire 56 cwt. per ton of iron made. The average make of the furnaces

in Great Britain, in 1880, was 10,113 tons, compared with 9512 tons in 1872, the quantity of coal used in the latter year amounting to 51 cwt. per ton of iron made, compared with 43 1/2 cwt. in the year 1880. The economy attained in a period of eight years being 7 1/2 cwt. to each ton of pig, made a saving of about 14 per cent.

EXTRACTION OF PHOSPHORUS FROM IRON.

The following process of extracting phosphorus from iron has been introduced by Jules Garnier, and depends essentially upon Heaton's principle, which is that phosphorus is separated from iron when the latter is operated upon by oxidizing agents, together with basic reagents. An ordinary furnace for steel manufacture is provided with a movable hearth of some basic substance, such as lime, calcined dolomite, &c. For each operation this hearth is provided with a sort of covering, consisting of two layers, the lower one being composed essentially of a very dry material containing much lime, while the upper one consists of rich iron ore containing a large proportion of lime and manganese. The furnace is then charged in the ordinary way with crude iron and is heated. As soon as a sufficiently high temperature is attained the iron combines with the lime contained in the covering, and the basic substances liberate carbonic acid, which passes through the melted iron, producing the following reactions: 1. In the first place, the acid on passing through the iron causes a violent disturbance of its surface, promoting rapid oxidation by the continued formation of new surfaces. 2. The carbonic acid is reduced, yielding carbonic oxide, which being highly combustible, materially increases the temperature of the furnace. 3. The liberated carbonic acid destroys gradually the combination of the covering previously mentioned, and the elements thereof are taken up by the iron. The higher oxides of the iron and manganese thereby obtain a supply of oxygen before they are changed to protoxides, which, together with the lime, act upon the phosphoric acid and oxide of silicon to such an extent as to separate the phosphorus and silicon. As soon as the liberation of carbonic acid ceases, it is merely necessary to keep up the temperature of the furnace for some time, during which the silicon phosphates will gather at the surface.

Bessemer Steel Manufacture in Great Britain.

There are 28 Bessemer steel works in Great Britain, the most extensive being that of Messrs. Bolckow, Vaughan & Co., Limited, in Cleveland, possessing six converters, of an aggregate capacity of 62 tons. Of these, four each have a capacity of 3 tons each and two for the manufacture of steel by the Thomas-Gilchrist process, each of a capacity of 15 tons. The annexed presents a complete list of these works in 1880, with the number and capacity of the converters in each works:

Number.	Name and Situation of Works.	Number of converters.	Capacity of converters.
1.	Henry Bessemer & Co., Limited, Sheffield.....	8	3 0
2.	Bolckow, Vaughan & Co., Limited, Cleveland.....	6	3 0
3.	John Brown & Co., Limited, Sheffield.....	4	7 10
4.	Sheffield Steel and Iron Works, Attercliffe, near Sheffield, Brown, Bayley & Dixon, Limited.....	4	8 0
5.	Charles Cammell & Co., Limited, Sheffield, Croyds, Charles Cammell & Co., Limited, Yorkshire.....	2	7 0
6.	Wearside Iron Co., Tudhoe, Ferryhill.....	3	3 10
7.	The Glasgow Bessemer Steel Co., Limited, Atlas Works, Glasgow.....	3	3 0
8.	Sam. Fox & Co., Stockbridge Works, Sheffield.....	2	5 0
9.	Lloyds, Foster & Co., Old Park, Wednesbury.....	4	3 0
10.	Bolton Iron and Steel Co., Limited, Bolton.....	4	5 0
11.	London and Northwestern Railway, Crewe.....	2	3 0
12.	Manchester, Sheffield and Lincolnshire Railway Co., Gorton Works, Manchester.....	4	3 10
13.	Messrs. Steel and Iron Works, Toxteth Park, Liverpool.....	10	5 0
14.	Manchester Steel and Railway Plant Co., Gibraltar Works, Newton Heath, Manchester.....	4	3 0
15.	Barrow Hematite Steel Co., Barrow.....	8	7 0
16.	The Dowlais Iron Co., Dowlais.....	3	3 0
17.	Ebbw Vale Co., Ebbw Vale.....	4	3 0
18.	West Cumberland Iron and Steel Co., Workington.....	2	6 0
19.	Phoenix Bessemer Steel Works, The Ickles, near Sheffield, Steel, Tozer & Hampton, Limited.....	2	4 0
20.	Carnforth Hematite Iron Co., Limited.....	2	6 0
21.	Patent Shaft and Axletree Co., Wednesbury.....	4	3 0
22.	Erasmus Steel Works, Middlesbrough.....	2	6 0
23.	Darlington Iron Co., Darlington.....	3	0 0
24.	The Moss Bay Hematite Iron and Steel Co., Workington.....	3	8 0
25.	Rhymney Iron Co., Limited, Rhymney.....	3	7 0
26.	Blenclyon Iron and Steel Co., Blenclyon.....	2	8 0
27.	The Standard Iron and Steel Co.,	2	0 0

In the manufacture of steel by the open-hearth melting process of Siemens-Martin, the number of works had not increased in 1880. Many of these establishments have augmented their resources by increasing the number of these furnaces.

The American Telegraph and Cable Company began the active operation of one of its Transatlantic cables on Saturday morning last. The line used was begun last May, and finished on July 8, and the first dispatch sent over it was a message of condolence with the President from the contractors, Siemens Brothers. The cable was delivered by the contractors to the company on September 1. The second cable has been laid for 2000 miles, and the steamship Faraday is now on her way back to England for more wire.

The Herreshoff Manufacturing Company, of Bristol, R. I., have received orders from the French Government for two vedette boats, similar to one recently built for the British Government at the same works.

The Iron Age

AND

Metallurgical Review.

New York, Thursday, October 6, 1881.

DAVID WILLIAMS - - - Publisher and Proprietor.
JAMES C. BAYLES - - - Editor.
JOHN S. KING - - - - - Business Manager.

RATES OF SUBSCRIPTION INCLUDING POSTAGE.

THE UNITED STATES, BRITISH AMERICA AND SANDWICH ISLANDS.

Weekly Edition.....\$4.50 a year.
Issued every Thursday morning.

Semi-Monthly Edition.....\$2.30 a year.
Issued the First and Third Thursday of every month.

Monthly Edition.....\$1.15 a year.
Issued the First Thursday of every month.

TO ALL OTHER COUNTRIES.

Weekly Edition: \$5.00—£1=25 francs=20 marks=12 florins=6 roubles (coin)=25 lire=20 pesetas.

Semi-Monthly Edition: \$2.50—£1=12½ francs=10 marks=6 florins=3 roubles (coin)=12½ lire=10 pesetas.

Monthly Edition: \$1.25—£1=6¼ francs=5 marks=3 florins=1½ roubles (coin)=6¼ lire=5 pesetas.

REMITTANCES

should be made by draft, payable to the order of David Williams, on any banking house in the United States or Europe; or, when a draft cannot be obtained, in postage stamps of any country.

NEWSDEALERS OR BOOKSELLERS

In any part of the world may obtain *The Iron Age* through the American News Company, New York, U. S. A.; the Wilmer & Rogers News Company, New York, U. S. A.; and London, England; or the San Francisco News Co. San Francisco, California, U. S. A.

RATES OF ADVERTISING.

One square (12 lines, one inch) insertion, \$2.50; one month, \$7.50; three months, \$15.00; six months, \$25.00; one year, \$45.00; payable in advance.

DAVID WILLIAMS, Publisher,
83 Reade Street, New York.

PITTSBURGH.....77 Fourth Avenue
J. D. W. Manager and Associate Editor.

PHILADELPHIA.....275 South Fourth Street
THOS. HOBSON, Manager.

CHICAGO.....35 & 37 Clark St., cor. Lake
HENRY SMITH, Manager.

CINCINNATI.....Builders' Exchange
T. T. MOORE, Manager.

CHATTANOOGA.....Eighth and Market Streets
S. B. LOWE, Manager.

BRITISH AGENCY.

The publishers of *The Iron Age*, 44 Cannon Street, London, England, will receive orders for subscriptions and advertisements on our regular terms.

CONTENTS.

First Page.—Nabholz's Riveting Machine. Ancient Door Furniture.

Third Page.—How Belts are made. Improvements in Planes. Armor Plate Trials in France.

Fifth Page.—Amesbury Expansion Matchers Heads. Future Mexican Cities.

Ninth Page.—Iron Mining in the United States. Condition of Business—Failures in the Last Three Months.

Eleventh Page.—The Qualities of Iron and Steel.

Thirteenth Page.—Metallurgical Notes.

Fifteenth Page.—Metallurgical Notes (Continued). Bessemer Steel Manufacture in Great Britain.

Seventeenth Page.—The Rise in Copper. Discriminating Duties in Favor of American Bottoms. The Tariff and the Laborer. French Shipping Bounties. Rival Freight Lines.

Nineteenth Page.—Tendencies in Modern Locomotive Practice. The Cotton Crop. American Institute of Mining Engineers. United States Charcoal Iron Association.

Twenty-first Page.—Slow Burning Roofs and Floors. New Iron Lighthouses. American Art in Tools. Work on the Brooklyn Bridge Steadily Advancing. The Amesbury Hand Saw Filing Machine. Industrial Items.

Twenty-third Page.—Industrial Items (Continued).

Twenty-fifth Page.—Industrial Items (Continued). Labor and Wages.

Twenty-seventh Page.—Trade Report. General Hardware. British Iron Market.

Twenty-ninth Page.—Iron. Metals. Coal. Old Metals. Paper Stock, &c. Foreign Trade Movements. Imports. Exports.

Thirty-first Page.—Exports (Continued). Philadelphia. Pittsburgh. Chicago. Chattanooga. Boston. Louisville. St. Louis. Cincinnati.

Thirty-third Page.—Baltimore. Our English Letter. Foreign. The Cincinnati Exposition.

Thirty-fifth Page.—Imports for the Third Quarter. Jones & Laughlin's Chicago Warehouse.

Thirty-seventh Page.—The Iron Age Directory.

Thirty-ninth Page.—New York Wholesale Prices.

Forty-first Page.—New York Wholesale Prices (Continued).

Forty-third Page.—New York Wholesale Prices (Continued).

Forty-fifth Page.—Philadelphia and Pittsburgh Hardware and Metal Prices.

Forty-seventh Page.—Boston Hardware and Metal Prices.

Germany has demonstrated that it is practicable to put telegraph wires under ground. She has no less than 221 towns and cities thus connected, and four years experience has proved satisfactory. Our own experiments are also satisfactory, but it is certain that the old system will not be abandoned voluntarily. The Germans have adopted simple and inexpensive methods, coal tar being used for insulating purposes, with no provision for repair excepting

instruments to locate a fault. American devices already approved by experts contemplate a system far more complete, and no time should be lost in applying them in the most practical manner.

The Rise in Copper.

Since the commencement of last year copper has gone through extreme fluctuations in this market, more so than in former years, for it touched 25 and 16 cents. In England the range for Chili bars was £56.10/ and £73, and this year, so far, £59 and £62.10/. In other words, copper has been in a very unsettled state, the quantities sent forth from the principal sources of supply having fluctuated a good deal, and caused great uncertainty both in Europe and here as to the real current output in any one quarter. As was foreseen if the war continued, production in Chili has decreased somewhat, a good many miners having been enlisted in the army and kept there, with little prospect at present that they will soon return. The exchange on London has also been subject to extreme fluctuations at Valparaiso, being influenced by the war news, and most of the time rather an impediment than a help to exportation. While the Chilean supply has thus been uncertain and rather on the wane, that from Spain has remained steady, the output in 1880 being about the same as in 1879, and this year will probably not vary much from either. Copper production in England from native ores has dwindled down to such extremely modest proportions that a slight increase or decrease remains unnoticed; it was 3662 tons last year, against 3462 in 1879. American production in 1880 was:

	Pounds.
Michigan.....	45,830,262
Maine.....	5,080
Maryland.....	264,547
Missouri.....	230,717
North Carolina.....	1,640,000
Pennsylvania.....	476,508
Vermont.....	2,647,894
Wisconsin.....	18,087
Colorado, Arizona, Idaho and California.....	5,764,462
Total.....	56,855,648

This year we shall produce a good deal more; various new copper districts in the extreme West now being reached by railroads are developing their output considerably, as it pays them largely to do so. Indeed the news from Arizona and other points was of such a sanguine character as regards this year's output, that during midsummer the price of copper in this market was affected so much that it dropped to 16 cents, at which manufacturers contracted largely for the entire balance of the year. But now we know that receipts from the new sources of supply at the West will not be nearly so large—this year, at least—as had been anticipated, and the quantities from there arrive so slowly that they have had, so far, no further perceptible effect on the market. This will, however, not remain so, and, beginning with the summer months of 1882, these new Western copper receipts will, we are inclined to believe, play a more important part than most people, probably, have any idea of now. We have just had a foretaste of extreme depression by reason of those new mines, and the warning should not be lost sight of, for the value of copper may be thoroughly revolutionized by them.

	1880.	1881.
January.....	21 @ 25	19 @ 19½
February.....	24 @ 24½	19½ @ 19½
March.....	22½ @ 23½	19 @ 19½
April.....	21 @ 22½	18½ @ 19
May.....	17½ @ 20½	18½ @ 19
June.....	18 @ 18½	16½ @ 18½
July.....	18½ @ 18½	16 @ 16½
August.....	19 @ 19½	16½ @ 17
September.....	18½ @ 18½	17 @ 18½
October.....	18½ @ 18½	18 @ 18½
November.....	18½ @ 18½	18 @ 18½
December.....	18½ @ 18½	18 @ 18½

While Europe has its Rio Tinto mines, overhanging the market like a cloud all along, we have a similar new region to step in and keep copper from advancing too much at any time under the stimulus of an increased local consumption, which certainly exists, for we got along well enough last year without sending any excess abroad, and in spite of the large home output we have shown. Next year we may be compelled to ship copper largely to get rid of a surplus, even supposing that consumption, which does not seem to have abated so far this year, remained as active as before. Meanwhile, Chilean affairs may suddenly take a more favorable turn, and the supply from all sources may be restored to its maximum. For the moment the London speculators do not see any breakers ahead, and they may succeed in pushing the price of copper a great deal higher ere the year comes to a close; but the metal will then be liable to recede all the more suddenly, sensitive as it will be in view of the uncertainties which surround it in both hemispheres.

Sagasta, the new Spanish Premier, evinces a spirit of enlightened statesmanship, giving promise of a brighter future for that most misgoverned of all European States. The recent elections please him, encouraging the belief that he can reconcile even Carlists and Democrats in support of the policy he now proposes to inaugurate. He says: "You can tell every one that in religious matters we shall give liberty alike to all—Jew, Protestant or Mussulman. No worship, no propaganda, no religious societies, even, will be interfered with. But I call upon the dissenters' sense of fairness not to provoke our fanatic masses by imprudent zeal. We shall also reform our marriage and education laws, so as to

increase liberty of conscience. Give us time, and in our home tariffs and our commercial treaties on both sides of the Atlantic I trust we shall show a spirit of reform and liberty. As regards Cuba and Porto Rico, it is my firm desire and intention to give them such reforms as will assimilate them completely to our own provinces. Every tariff or legislative measure, every negotiation with America that can develop the prosperity and loyalty of the islands, will have my unconditional support. Their exports to Spain will also be better treated in future, and you know that in my Cabinet nearly all are pledged to Cuban reforms." It is gratifying to be assured that something will be attempted in revenue reform, however hopeless we may be of measures for the regeneration of Cuba. The customs collections are simply execrable in the manner of their enforcement, and until there is a change, friendly relations with neighboring states is almost impossible.

Discriminating Duties in Favor of American Bottoms.

In the recently published interview between Senator Don Cameron and a reporter of the New York Herald, a suggestion is made that is worthy of consideration. After stating, in answer to a question about subsidies, that the American people did not like them, he says: "My plan, now somewhat crude and open to modification, would be to give American ships a duty rebate—that is, give to all American ships, manned by Americans and run by American houses, part of the duty derived by the tariff on their freight. That would be a large inducement to capitalists, and if properly and fairly carried out I believe the plan would be beneficial, popular and eventual."

This is in effect a system of discriminating duties in favor of goods carried in American bottoms. As is well known, there exists in the tariff laws a section that imposes an additional duty (or discriminating duty) of 10 per cent. on all articles imported into this country in vessels not of the United States, but the clause is made nugatory by a provision that it shall not apply to goods imported into this country in vessels not of the United States entitled by treaty to be entered at the same duties as are paid on goods imported in vessels of the United States. This proviso, combined with the "most favored nation" clause of many of our treaties, renders this article a dead letter, and will render any similar provision of no value. It would appear that the way to revive our shipping interest and to increase the amount of goods carried in American vessels, is to make it an object to shippers to give their freight to American vessels. This was the object of the clause regarding discriminating duties, but it is of no avail, and it seems impossible that a clause of the tariff act can be so framed as to avoid our treaties.

We do not fully agree with Senator Cameron that the American people object to subsidies. Many do, no doubt; but in our opinion the chief objection to subsidies lies in the popular belief that they are obtained by corrupt means—that enormous sums are spent in obtaining them, and that if this is so there can be but little need of them; or, in other words, if \$50,000 are spent to get a \$100,000 subsidy, there is need of only a \$50,000. This has led to a suspicion attaching to all subsidies. We believe, however, that subsidies properly obtained, and in amount proportioned to the needs of the case and the work done, are legitimate expenditures of the public money, and will be indorsed by the people. Remove the taint of corruption and public sentiment will be satisfied. England has expended millions of dollars in this way, and her shipping and finances feel the effect. The plan of Senator Cameron at first sight looks like the "discriminating duty" plan, but it is not. A discriminating duty is deducted from or added to the regular duty when it is paid, but the plan proposed, as we understand it, involves a rebate in a duty paid. It might take the form of a bounty paid to the American vessel that would enable the owner to take freight at less rates. This scheme might be worked out so as to make it easily applied and yet avoid the treaty stipulations. Certainly, if our shipping is to regain its previous position, there must be some inducement held out, at least for a while. This subject will be among the questions discussed at the tariff convention, to be held in New York in November, and the combined wisdom of that body should find a method that would be acceptable to our people, and at the same time practicable.

Rev. Andrew Jamieson, of Glasgow, read a paper before the recent meeting of the British Association at York, on "Wages Disputes and their Remedies," that has attracted considerable attention from the English press. The details of arbitration as presented by him we need not give, as we have so often treated the matter in our columns. One objection made by him is worthy of notice, as it is so often urged in this country in opposition to arbitration, and it is this—that "the arbitrator's decision can at best claim to be only an approximation to the exact truth, which it is prudent to accept in the absence of something better." Now, as we understand human nature, and especially human nature as it manifests itself in wages disputes, any decision must, of a necessity, be only an approximation to the exact truth.

In other words, in the present relations of

employer and employed, it is impossible to arrive at the "exact truth," and if it was reached, one or the other would not recognize it. Arbitration only aims at reaching the best conclusion that human judgment can reach under the circumstances. When two men or two bodies of men differ—and differ honestly, we will assume—and find that they cannot reach a joint conclusion, they call in a third party, to whom they state the case and allow him to decide between them.

The Tariff and the Laborer.

The *Labor Tribune* makes the statement that the Cincinnati mill owners have determined to import skilled labor for their mills from Europe. This it regards as "flinging to the dogs" the principle of protection, and proceeds to threaten what direful things will happen to the iron interests if this policy is pursued, strongly intimating that the tariff will be repealed. It says:

The iron workers have always welcomed their brethren from abroad who come in a legitimate way, but they do not take kindly to a protective policy which means protection only for the employer—a policy which means protection for the employers, but stimulated free trade in producers. Workmen as a class have the average quantity and quality of brains and understanding, and are not to be fooled by cries in election campaigns of "protection to home industries," while the manufacturer at other times exhibits a predisposition to buy labor on free-trade principles. A protection that protects our goods and not our labor is but a sorry makeshift. There must be protection for both or protection for neither. It is just as the Cincinnati mill owners please. If they insist upon further effort to gather European iron workers to bring hither to take the place of men on strike, they should take into the account the warning here set forth.

We do not purpose to discuss here the advisability or wisdom of the policy of the Cincinnati iron manufacturers in sending abroad for men, if they have adopted this policy, of which we have no evidence except the *Labor Tribune's* assertion. They certainly have as good a right to bring men from any point they please as the Union has to prevent their coming or to persuade them to return after they have begun work in the mills. The point that we wish to make is that the *Labor Tribune* shows its ignorance of the history and aims of protection, in its assertion that it is contrary to this history and these aims to bring the laborer of foreign countries to this country, or, as it expresses it, the Cincinnati mill owners violate "the unwritten law of protection by seeking to import foreign skilled labor." The facts and history are all the other way, and no one knows this better than the iron and steel workers of this country. One of the points urged in favor of high tariff on these articles always has been that it would enable our manufacturers to pay higher wages than were paid in Europe, and so attract the best skilled workmen of Europe to this country, and it has done it. Not only have they come voluntarily, but again and again have manufacturers sent and brought them over. There is not a steel works in Pittsburgh in which proof of this statement cannot be found, and we have not the least doubt but that scores of men can be found among the members of the Amalgamated who have either themselves been so brought or their fathers. Indeed, the principle of protection has been to "Spoil the Egyptians" of their best men. It is true that in late years there has been no need, or but little need, of sending abroad for men. There has grown up a class of American-born workmen, or foreign workmen have come to this country of their own choice; and the fact is that there is nothing in the history or arguments for protection that justifies the statement that there is an unwritten law against the importation of foreign skilled labor, but just the contrary. Further, protectionists have again and again argued that men were the most expensive thing to produce, and the more skilled the more expensive, and that it was the true policy of this country to offer such inducements as should bring to us these men, who had been raised and taught at the expense of others. This idea will be found running through all the arguments of the older protectionists. In this we only state facts. Of the advisability of sending abroad at this time to import foreign skilled labor for the Cincinnati mills, we do not express an opinion, but if it has been done it does not violate the unwritten law of protection.

Now, about the implied threat that if skilled labor is brought here by the manufacturers the duty on iron will suffer. It is about time that this nonsense ended. The iron manufacturers of this country can stand a reduction in labor cost. And when labor assumes that the benefits of the tariff are more for the manufacturer than the workman, it assumes what every intelligent workman knows to be false. Such threats as those of the *Labor Tribune* are childish, and only alarm those who wish to be frightened.

The *Age of Steel* seems determined to stick to its previous misstatements regarding the relation of the Pittsburgh iron manufacturers to the Cincinnati strike. In a recent editorial it says: "As to the Pittsburgh iron men who have become entangled in the 'dirty mess, they know just how much truth there is in the charges that have been preferred against them—they know whether they are guilty or not. When placed at the bar of public opinion to plead to the indictment, they took good care not to open their mouths. If they had manfully and indignantly said 'not guilty,' these words would have had great

weight in convincing the public of their innocence. Many a man has gone to his doom on no stronger evidence, circumstantial though it be, than these men, who, with their influence and money, corrupted Mr. Jarrett, and through him struck what they hoped would be a fatal blow at rival industries. If they can bear up under the imputations cast upon them, very well." It is pertinent to ask: Who has brought the Pittsburgh manufacturers to "the bar of public opinion to plead?" The Cincinnati manufacturers certainly have not done so, for they state explicitly that they make no such charge against Pittsburgh manufacturers as the *Age of Steel* makes, nor do they believe them true; and if the parties interested do not ask the Pittsburgh manufacturers to plead, they are hardly called upon to answer irresponsible newspaper gabble.

French Shipping Bounties.

The subject of developing the shipping interests seems not only to be a question of importance in this country, but in France as well. The difference between the two nations is that France has already taken active measures to develop this industry, while we are thinking about it. About twelve months ago a Merchant Marine Bill was introduced into the French Legislature, which became a law, and went into force Jan. 1, 1880. Under this bill a bounty of 60 francs per gross registered ton of hull, and 12 francs per 100 kilos. weight of engine, was made payable to constructors of vessels in France. The bill also proposes to pay to owners of foreign-going French vessels 1½ francs per registered ton for every 1000 miles run on any direct maritime line. The result of this act, though it has been but nine months in operation, has been very marked. Already it has led to the establishment of several shipbuilding yards on the French coast, and to the opening of new routes of travel to French ships. English shipbuilders and owners are taking the alarm and crying out loudly against the bounties. The *Ironmonger* comments on it editorially as follows:

We are assured that the bounty which may be earned by the French shipowner trading to the places mentioned in the West will be equal to the entire profits now made by the British shipowners engaged in the same trade; while, as regards the East India trade, the bounty will be sufficient to meet the dues of the Suez Canal. It is evident from these facts that the British shipowners will be rather inconveniently handicapped by the bounty. If the French can equip and work their ships as economically as the British, they will have a great advantage, as the bounty will probably enable them to reduce freights to such low figures that the British may not be able to compete profitably. The members of the Glasgow Shipowners' Association have given expression to the opinion that the effect of the Bounty Law will be to drive British ships out of the French over-sea carrying trade as soon as vessels can be built in France to do the whole of the carrying, and also that much of the British carrying trade itself may very likely be transferred to the French flag. Their hope is that the French people will speedily tire of paying such vast sums of money to bolster up a particular industry; and, in such an event, with a fair field and no favor, the British shipowner would have nothing to fear. Possibly even his present apprehensions regarding the evil results of the Bounty Act may be largely overlaid, but this can only be determined by the experience of the next ten years.

And now what does the United States propose to do in view of these facts. To sit idly by and let other nations retain the present proportion of our carrying trade and acquire more, or take some such steps as England and France have taken, in order that we may at least do a fair proportion of our own carrying trade.

Rival Freight Lines.

A war of words now follows the war in railroad freights, and Messrs. Garrett and Vanderbilt have both been heard. The latter succeeds in demonstrating, at least to the popular mind, that those in control of the New York Central have not cut rates, but have met them. As he says: "What ever any other line was willing to carry for we were ready to follow on the same terms. If at the same rates a larger share of the business comes to us than is pleasant to our rivals, we cannot help it, and they cannot expect us to submit quietly to their efforts to establish an equilibrium by sticking a knife into one of our arteries. It is not for the purpose of crushing the construction of parallel lines that I have sought to maintain the rights of the roads of which I am president." Mr. Garrett, on the other hand, evidently thinks that Mr. Vanderbilt should permit competing lines to be built, and that freight rates should be kept where all the roads can make money. Mr. Vanderbilt certainly has popular sentiment with him as the question now stands, although, unfortunately for New York State, the Erie Canal is the severest sufferer. The Welland Canal suffers too, for we are told that the railroad companies will run their propellers on the lakes at a loss, rather than permit Western traffic to go through Canada. President Garrett says that upward of \$2,000,000 have been lost by the railroad companies in the last two months, in consequence of rate cutting. But he will probably draw few sympathetic tears, for it is commonly reasoned that the mercantile classes have saved an equal amount in costs of transportation. Undoubtedly New York City has profited largely this season from cheap fares and low freights, enabling her to do business face to face with men from the far West. It is obvious, however, that the assumed advantages are to some extent

fictitious; that in fact trade is more or less deranged, and suffers detriment in many ways, to be realized more fully in course of time. Railroad hostilities afford no ground for complacency, and should cease.

Our local merchants are greatly annoyed by new instructions sent from Washington to foreign consuls, requiring them to certify invoices of merchandise intended for shipment only when presented at the places where the goods were manufactured, or when there is produced at the same time a receipt or bill of lading issued by some railroad or steamship within the particular consular district where the application is made. When orders are received at a central point, as at Paris or London, for the purchase of goods from different manufacturing towns in the neighborhood, it has been customary to present a single invoice to the consul for certification; but now there must be a separate invoice for each consular district comprised in the range of purchases, accompanied by the shipping receipt or bill of lading, before a certification can be obtained. It is inevitable under the new arrangements that vexatious delays should occur in forwarding goods, for it will be useless to make shipments unless the certified invoice is with the packages, as their destination would be the bonded warehouse, at the importers' risk. Another sore grievance is the multiplication of fees, which already amount to an onerous burden. It were better that the whole system of consular certificates were abolished altogether, as these documents receive no attention in our custom houses, and are practically a farce on their face.

The pernicious effects of Wall street speculation are beginning to be felt in the squeeze for money. Now that the fall trade is opening in good earnest and money is in demand for legitimate business, it is found that the great bulk of available cash handled by our leading institutions has been already absorbed in enormous speculations in Western cities, and new demands are springing up to move cotton in the South for export. Forthwith all eyes are turned to the Government Treasury, and Secretary Windom is expected to come to the rescue to avert a possible catastrophe. We think it quite in order to suggest that the government was never instituted to aid in keeping aloft the financial balloons of Wall street. A shrewd financial writer says: "One of the objects of the independent Treasury was to use its accumulations as a natural check upon over-importations. An excessive foreign trade piled up the customs in the Treasury vaults, and this, like the governor on the steam engine, regulated the pace and brought the importations within safer limits." The laws of trade afford a better reliance than the caprice of money gamblers, who are so anxious to break into the Treasury vaults whenever there is a "squeeze."

Mr. Jeremiah Hoad, of the firm of Fox, Head & Co., of Middleboro', in whose works a system of industrial partnership was in operation for eight years, ascribes its failure to the influence of trades unionism, the unionists being averse to its continuance. From 1870 to 1874 the amount distributed to the employed, in addition to their regular wages, was £6000. A similar arrangement, but one somewhat older and longer continued, existed at the coal works of Messrs. Briggs. The testimony regarding this attempt at industrial partnership formed quite an interesting part of the report of the Parliamentary Trades Union Commission of 1857. This also has been abandoned because of trades union opposition, it is alleged. It is fair to say, however, that such men as Lloyd Jones, Thos. Burt and Geo. Howell deny that trades unionists oppose the principle of industrial partnerships.

The construction of the Panama Canal proper has not yet commenced. So we are told by correspondents on the spot. And when it is said further that 70 out of 1000 men employed have already died, the prospects appear to be anything but brilliant. It is also stated that the Brussels excavators employed work expensively, except in soft mud, and that the excavation at one of the new villages is found to cost actually \$1.25 per cubic yard, instead of three cents, as originally estimated. The hospital accommodations, however, are said to be very fine—including graveyard conveniences, we suppose.

The affairs of Peru seem as far from a settlement as ever. The small force subject to Calderon, representing the Provisional Government, have at last been disarmed by the Chilians, apparently for the reason that deserters to the Montonero bands were carrying away valuable weapons. Peru is not, and from present indications never will be, a conquered country, only so far as affecting the government organization and political existence. Under such conditions the revival of trade will come slowly.

The Lumberman describes a model car wheel made of sawdust, consisting of an iron rim of 7 inches outward diameter by 1/2 inch thick, fitted with a well-proportioned hub, the space between being filled with pine sawdust, pressed in so solidly that we are ready to believe the assertion that a pressure of 23 tons applied to the hub failed to develop any signs of weakness.

Tendencies in Modern Locomotive Practice.

Ever since the beginning of locomotive building in the United States, some 50 years ago, there has been a constant development in progress, which has closely followed the changing conditions of railway service. At times, it is true, but little change could be seen in the types of engines employed. Upon examination, however, we shall find that such times were marked by periods of very remarkable uniformity in the conditions of the service to be performed. As was natural, in the earlier engines there was a constant and pronounced seeking after the best type for a given service. As there was no definite knowledge, everything that was suggested was tried, if it had any appearance of being right. In this way a vast number of designs had opportunity of demonstrating their good and bad points. It would be comparatively easy, from the lists and circulars of a great establishment like the Baldwin Locomotive Works, to write the history of locomotive engineering in this country. These works have been very exact and exhaustive in their publications, and with them before us, and with notes gathered from members of the firm, we shall attempt to say something upon the present tendencies in locomotive practice.

Glancing through the engravings of early engines as well as those of later date, we find that the history may be divided into three great periods. The characteristic of the first was the search for the type. It was marked by such machines as the "Best Friend," "Ironides," and "Planet" engines, on the Mohawk and Hudson, and the grass-hopper engines, on the Baltimore and Ohio roads. Toward 1850 the "American" type of engine began to be plainly marked. It is even traceable in an eight-coupled eight-wheeler of Baldwin's make, built in 1846. After 1853-4 the American engine became well-established, and we think may be said to have done all the railway work for the country for 18 or 20 years, and the passenger work up to the present time. From 1854 or 1855 to within a few years may be called a period devoted to the improvement of the type (the American engine). New types, it is true, were called upon for special work. Variations in design were made to adapt the engine to such work, but the mass of the engines in use were of the familiar American pattern. The student, watchful of details, would hardly find any similarity between the standard eight-wheeled passenger engine of 1874 and 1854, yet the differences, we think, are clearly those of detail—the type was fixed.

In a general way, the railway work of the country from 1850 to 1870 was uniform. Occasionally there were roads with exceptional grades, where heavy engines were called for, when the American had to be modified by the addition of another pair of driving wheels, giving the well-known ten-wheelers, or, with the pony truck, the "Mogul." In 1866 four coupled wheels added to the American engine gave the "Consolidation" pattern, with its ten wheels and eight drivers. All of these were special, and though largely used in some portions of the country, had not taken their places as general factors in the great railroad system. Transitions from one period to another have been so gradual, so noticeable in some portions of the country, and so unobtrusive in others, that only by the consultation of the records of a great establishment can any clear idea be gained of them. In fact, we may hardly be able to say that one period had an end and another a beginning. At the present time we are apparently well entered upon a new period. It seems to be a period of modified types. There is new work to be done and new forms are needed. These are mostly obtained from old patterns, but the changes are in many cases radical, and the engines produced would, at first glance, scarcely be recognized as belonging to any known type. Among the leading new features are the following classes: Street motors, narrow-gauge engines, engines for high speeds and for heavy freight traffic. It is noticeable that the latter are called for on both the narrow-gauge and standard roads.

In order of time the street motor was one of the first departures from the ordinary types. Upon the construction of these the Baldwin Works began as long ago as 1875, and, as in all cases where a new field is entered, made their first effort to discover the most suitable form. Like the early attempts years ago on the Second Avenue line in this city, there was at first an apparently very marked success, even with imperfect forms. The test of time showed, however, that the separate motor had certain advantages over that which was placed in the car, and also developed the fact, which we think has not yet been very fully recognized by outsiders, that dust and dirt were the most difficult elements to contend with. The motor or car built by the Baldwin Works and put in operation in 1876, used about seven pounds of coal per mile run, and was managed by one man, who was driver and engineer at the same time. It was capable of hauling an extra car during the busy hours. Experience has caused the abandonment of the crank-axle, and the adoption of the standard American practice of "outside connections." The first car and motor combined showed that a separate motor was preferable, and as now constructed the motor is separate from the car, has four coupled drivers of small diameter and all parts of the machinery inclosed from sight. Various plans by which machinery could be placed in a higher position, so as to be out of the way of the dust, have been considered, and a few have been tried here and many abroad. It has been found cheaper, however, to put the machinery in the usual position, and then make special provision for rapid wear of parts, than to sacrifice more important features. The cost for renewals are now put into the working expense account.

The success of these motors has become a fixed fact, and where there are any suburban lines or where high speed is possible, they are becoming favorably known. In cities they are not yet in a position to compete with horses, as the speed has to be reduced. The president of a horse-car company, whose name is not now at hand, estimated

that last year it cost half a cent. per mile to haul a passenger by horses, and three-quarters of a cent. by steam. It will be remembered, however, that the cost of feeding was exceptionally low at that time. Probably this season the account would be very different. We have not exact figures in regard to the number of motors now running, but suppose nearly 200 motors run by steam have been turned out by the Baldwin Works up to the present date. Many other shops have done something in this line, and the total number in the country is very large. While the type may not yet be considered as fixed, yet it is probable that no special departures from present form will be made until something radically better than anything that has yet been suggested is presented. Larger wheels involve larger cylinders and heavier weights, while gearing is costly, heavy, and can hardly be said to be durable. The motor for street cars has a wide field, and we may look for its extensive and rapid introduction. The cost of running and repairs can now be estimated with certainty, and in equipping a road with them there are no longer unknown quantities to be encountered. They are finding a field not only in the suburbs of our cities, but in many of our smaller towns, making easy the connections between villages which would be otherwise impracticable or unprofitable.

The narrow-gauge railway craze has at last succeeded in giving us a system of narrow-gauge railways. This has called forth many modifications of the American eight-wheel engine for passenger service, and these were at first supposed to be amply sufficient for all the work of these roads. As their traffic increased, it was found that the limit of capacity was soon reached. The "Mogul" was soon adopted for the narrow-gauge freight service, and for a time seemed to answer the needs of the roads. More recently, the Consolidation, an eight-coupled ten-wheeler, has been adopted for the heaviest work; but even this hardly answers all the requirements of a busy line. The narrow-gauge freight problem is a very difficult one. Large loads must be hauled on light rails, and the weight per wheel must of necessity be very small; consequently the locomotive builder finds himself obliged to multiply his drivers, keeping the weight even upon each pair. The latest thing in this line which we have seen has ten coupled driving wheels and the usual swing-beam "pony" (2-wheeled) truck with a radius bar. The cylinders are 18 x 20 inches, and the total weight of the engine is 90,000 pounds; yet this enormous weight, of which 80,000 pounds is on the drivers, gives a load of only 8000 pounds per wheel. A few years ago the narrow-gauge people were boasting of their light roads and light engines, and seemed to think they could not get things too light. For such people to be ordering 90,000 pound engines strikes us as rather good. A 45-ton engine is a very fair weight, especially for a light road.

These narrow roads, it appears, from the experience of the builders, find it necessary to get as heavy engines as possible, in order to handle any considerable traffic. The builders, therefore, have to make up for the disadvantages of light rails and narrow gauge. The engine which we have just mentioned has 36-inch drivers, placed very close to each other. All the tires, save front and back pairs, are plain. The rigid wheel-base is 12 feet 8 inches only, and even this might be reduced. This makes it easy for them to run around sharp curves. Few engines have ever been turned out from any works more striking in appearance than these. By carrying the fire-box back of the drivers, it has been possible to secure sufficient width to give an ample supply of steam for the engine.

Upon standard gauge roads the freight engine of the immediate future is likely to be the Consolidation or eight-coupled ten-wheeler, the "E" engine of the works. At least this is the engine which will give the most economical result on all roads when the capacity is in any way taxed. Of course, it is possible that this Centipede type of which we have just spoken, may some time become necessary even on level lines of standard gauge. The regular Consolidation pattern is made up to a weight of 108,000 pounds in working order, of which some 94,000 are upon the drivers. The cylinders for the heaviest engines are 20 inches in diameter, and 26-inch stroke, with 48 or 50-inch drivers. Such an engine is capable of hauling a total load of 2740 gross tons on a level track. In regular work they will take trains of 90 loaded cars (box). In one case, on the Philadelphia and Erie road, a Consolidation engine hauled 180 cars and a "dead engine." Though not intended for speed, they easily make 25 miles per hour. Though aggregating an enormous weight, they do not exceed in the weight per wheel the load the larger sizes of express passenger engines of the American pattern put upon the rails. It is a well-proven fact, that it is much better to add extra pairs of drivers to increase the adhesion, than to attempt to greatly increase the load upon a smaller number. By the use of flanges on the main and trailing drivers only, leaving the others plain, the rigid wheel base is reduced to 9 feet 2 inches with 50-inch wheels, which is only 6 inches more than that of the heavier American passenger engines with 60-inch drivers. Whether the needs of traffic in the future will require further addition to the tractive force remains to be seen. Possibly, as cars become heavier and stronger, and longer trains can be handled, still heavier weights in freight engines will be desirable.

The growing needs of mines for power for underground haulage has led to the development of a style of engine which is quite unique, and which appears to have a wide field of usefulness upon the surface as well as underground. The mine engine in appearance reminds the observer of a turtle, since it carries a tank on its back not unlike a turtle shell in form. The whole height of these machines is scarcely more than 5 1/2 feet from the rails to the top of the stack. Coal is carried on a box at the rear of the frame, and the whole affair is as compact and handy as one could well desire. Usually a boy acts as engine driver. We have seen these engines in operation in and about large iron works, where 2-foot gauge roads

laid with very light rails run in all directions. They are much quicker than a team of horses, more powerful, or at least capable of more work, and economical. Sometimes these engines are built with several cylinders, or compressed-air holders, in the place of the boiler. When these machines are to be used for work in and about a large factory, or in handling goods in any manufacturing establishment, pipes for compressed air are carried to various points along the track, so that the holders can be charged at a number of convenient points. This saves the engines from being stalled, or from the necessity of frequently returning to the starting point. This apparatus is neat and cleanly, no fire is employed, and there is no danger from sparks or annoyance from smoke.

In regard to these engines, we quote the following from "The History of the Baldwin Locomotive Works from 1831 to 1881": "Mine locomotives, generally narrow gauge, for underground work, were first built in 1870. These machines have generally been four wheels, connected with inside cylinders and a crank axle. The width over all of this plan is only 16 inches greater than the gauge of the track. A number of outside connected mine locomotives have, however, been constructed. In this pattern the width is 32 inches greater than the gauge of the track. A locomotive of 20 inches gauge was built for a gold mine in California in 1876, and was found entirely practicable."

During the past year or two very serious efforts have been made to secure a higher rate of speed on many of our leading roads. High speeds have not been greatly needed in this country, because of the common use of the sleeping car, and the fact that many of the more important cities are so situated that by slow running the distance could be made in one night. When the same run is to be made in the daytime, unless it can be shortened so as not to seriously break into business hours, there is little inducement to run fast, business men preferring to take night or evening trains, and other passengers caring little about the matter. By averaging 45 miles per hour, the time from New York to Philadelphia, however, could be shortened very much, being reduced to two hours. To do this, owing to various causes, such as the ferry and stops in cities, it is necessary to be able to run at 60 miles per hour or over. The Pennsylvania Railroad and Bound Brook Line have been doing this with the standard American engine, slightly modified for the purpose.

The 500th locomotive built by the Baldwin Works was finished in April, 1880, and presented some novel features, and yet it was in some sense a return to the type of engine built by M. W. Baldwin as long ago as 1849 for the Pennsylvania road—perhaps we should say a modification of the old fast passenger engine with single drivers. How fast these were can be judged from the fact that one of these engines—the "Governor Paine," owned by the Vermont Central road—could be started from a state of rest and run a mile in 43 seconds. The new engine was designed for fast passenger service on the Bound Brook line from New York to Philadelphia, and was intended to run, with a light train, 60 miles per hour, and use anthracite coal for fuel. The cylinders were 18 x 24 inches, with one pair of 78-inch drivers and a pair of 45-inch trailing wheels, which were equalized with the drivers. This reversed the position of the drivers of the old engines when they were placed behind the fire-box. The small trailing wheels, by carrying the boiler outside of and over them, made space for ample room in the fire-box, which is no less than 8 x 7 feet. The weight on the drivers can be varied from 35,000 to 45,000 pounds. The valves are of the "Allen" pattern, and have 5 1/4 inches travel. Unusual precautions were taken to insure the coolness of all bearings when running, those of the tender being supplied with water from the tank.

Whether engines of this pattern will be able to perform the work required, is a very interesting question. That they handle light trains admirably is beyond a doubt, but whether they can be made to take a heavy train of drawing room cars at a high speed is questionable, unless, of course, a very heavy weight is placed upon the drivers, in which case they would become very destructive to the track. They have great advantages in the way of large fire-boxes and ample grate surface, while the single pair of drivers obviates the use of the parallel rod, the breaking of which has been frequent upon fast engines.

While large wheels are essential to great speed, it is difficult to increase their size much beyond 6 feet upon an American engine, for the reason that beyond that diameter the center of gravity of the engine rises very rapidly and becomes dangerously high, but with single drivers almost any diameter is possible, and in England and on the Continent eight and ten-foot wheels have been used. The single driver engines have given interesting performances, but as there seems to be no difficulty in getting high speeds out of the coupled engines now that certain alterations have been made in the details, it seems probable that they will have the preference.

In going over the special work which we saw in the Baldwin shops, just turned out, we find that there are many interesting features worth mention. Many Wootton boilers have been built during the past season, and they appear to be giving much satisfaction. These boilers, or more correctly fire-boxes, have been largely used upon Consolidation engines where ample grate surface is greatly needed to supply steam for their heavy work.

While these signs of change are visible in the styles of locomotive engines, it seems hardly probable that we are to expect decided changes in the types long employed. The "Forney" locomotive, in which the truck is placed beneath the tender and the drivers under the barrel of the boiler, has made a place for itself, yet it is rather a modification and an improvement of the American type than a radically new one. Entirely new conditions, like those of street railways, may bring new styles like the street motors, but even where the boiler is replaced by a series of cylinders for holding compressed air, as is the case with several engines now under way, the essential features of the engine and running gear are retained. We may then conclude that while there are

new developments to be made and improvements to be introduced, there will not for a long time to come be a radical departure from the styles now considered standard.

This conclusion seems to have the more weight, because even a hasty glance at the three engines in process of construction at the works develops the fact that those types which are in use are capable of numberless modifications. Thus, when a lumberman wishes for power upon a logging road laid with wooden rails, he finds in the drafting room an engine already designed for the very purpose, capable of hauling a heavy load over an uneven road—light, strong and flexible. The ironmaster who has to replace the horses in the yard with power, finds a type of engine, designed, it is true, for other purposes, but all ready for his work and perfectly adapted to it. No matter what the track may be, if only of strips of hardwood plank laid upon the surface, engines can be had of types already tested that will work it successfully, and with economy, whether the gauge be 6 feet or 18 inches.

The Cotton Crop.

The growth of cotton in the United States for the year 1880-1, was the largest ever known in our history. The crop of the previous year was the largest yield up to that date, the total being 5,761,262 bales; but the last year gave us 6,605,750 bales, exceeding the highest previous total by 844,488 bales, and overstepping in its magnitude the most sanguine expectations. Much of this excess is due to the favorable picking season last fall, the frost holding off until most of the top cotton had an opportunity to mature. The crop is made up from the following items:

	1878-79.	1879-80.	1880-81.
	Bales.	Bales.	Bales.
Receipts at the ports.....	4,447,824	5,027,011	5,878,106
Sent overland.....	439,841	518,240	508,339
Consumed at South.....	186,489	215,981	219,317
Total crop.....	5,074,155	5,761,252	6,605,750

The overland item of cotton sent directly to the mills includes also the cotton sent by rail to Canada, repeated in the table of exports. There is to be added to the Southern consumption 5994 bales, taken out of cotton received at the ports. The disposition of this large crop may be gathered from the record of shipments and the home consumption. The following is a comparative table of the exports to foreign countries:

	1877-78.	1878-79.	1879-80.	1880-81.
	Bales.	Bales.	Bales.	Bales.
Great Britain.....	2,047,182	2,052,355	2,554,489	2,838,167
France.....	495,135	429,848	397,727	508,339
Continents.....	690,059	933,804	875,605	1,148,104
Channel.....	123,583	36,530	36,600	31,016
Canada.....	15,067	20,452	24,090
Total.....	3,355,942	3,487,604	3,885,091	4,589,846

The crop of Sea Island cotton is given at 35,021 bales, against 24,862 for the previous year; 21,510 bales for 1877-8, 18,352 for 1876-7, and 14,575 for 1875-6. The largest crop of Sea Island ever marketed was in 1858-9, when it reached 47,592 bales. The average weight per bale of the Sea Island cotton last year was 350 1/2 pounds, against 348 1/2 for the previous year. During the earlier part of the current year the more sanguine dealers looked confidently for something over 7,000,000 bales. The long drought of the late summer months has reduced this estimate considerably, and there is now a wide difference among speculators as to the probable result. Much will depend, of course, on the date of the first killing frost.

American Institute of Mining Engineers.—The secretary has issued the following notice to members: The autumn meeting of the Institute will be held in Harrisburg, Pa., beginning October 25th. A subsequent notice will give the programme of the meeting. Members are requested to give early notice to the secretary of their intention to read papers at this meeting. There are on hand a considerable number of the pamphlets of Dr. Dudley, Dr. Holley and Mr. Sandberg on steel rails, and also of the discussions at the Baltimore and Philadelphia meetings. Members wishing extra copies of these pamphlets may obtain them by writing to the secretary.

THOMAS M. DROWN, Secretary.
EARTON, Pa., Sept. 17, 1881.

United States Charcoal Iron Association.—The United States Association of Charcoal Iron Workers, to meet at Cincinnati October 7, will probably have an interesting and profitable meeting. Friday, Saturday and Sunday will be passed in Cincinnati. On Monday, Richmond Furnace, Hamden, Wellston, Jackson, Monroe, Scioto Furnace and Ironton will be visited, the association remaining at the last named place over night. On Tuesday they will visit the Belfont Iron Works, Lawrence Furnace, Etna Furnace, Etna Mines and back to Ironton. Wednesday will be devoted to visiting the mills and Hecla, Sarah, Alice, Grant and Belfont furnaces. No programme has been arranged for Thursday, "owing to the uncertainty of navigation"—from which we presume that, if practicable, the association will go somewhere by water. These excursions take in the principal points of interest in the Hanging Rock region, and we have no doubt the members will be the recipients of delightful hospitality wherever they go. The programme is so arranged as to give plenty of time for meetings for papers and discussion.

A letter from Rio says that since the suspension of the American line to Brazil, the delays in the mails and uncertainty in receiving goods are doing considerable injury to American trade. The English steamers are upward of a month in making the trip from New York to Rio.

A London dispatch of the 4th inst. says: In accordance with the recent decision of the ironmasters to reduce the production of pig iron, only 105 furnaces are working in the Scottish iron works this week, against 121 last week.

DUNNING FINISHED STEEL HORSE SHOES.

The most popular Horse Shoe in the world. Will outwear three Iron Shoes.

Dunning Steel Finished Horse Shoes may be ordered in any quantity, packed, assorted sizes to suit, from the following hardware houses:

SIMMONS HARDWARE CO., St. Louis.

HIBBARD, SPENCER & CO., Chicago.

S. D. KIMBARK, Chicago.

JONES & LAUGHLIN, Chicago.

KELLY, MAUS & CO., Chicago.

PARKHURST & WILKINSON, Chicago.

W. B. BELKNAP & CO., Louisville.

NICHOLS & DEAN, St. Paul.

H. KAHLO & CO., Toledo.

W. J. HOLLIDAY & CO., Indianapolis.

COOMBS & CO., Fort Wayne.

GEORGETRITCH, Denver.

STEVENS & GARRIGUES, Leavenworth.

B. D. WEST & ROSE,

97 Liberty St., New York.

LOCKE, HALE & CO.,

29 Tyler St., San Francisco

Send for sample keg, assorted sizes. Full descriptive catalogues sent on application. Manufactured exclusively by

THE CHICAGO STEEL HORSE SHOE CO., Chicago, Ills., U. S. A.
FACTORY AT PULLMAN (NEAR CHICAGO), ILLS.



Are forged from a solid bar of steel. Afford a firm level bearing, thereby securing to the horse the most natural position for comfort and speed. Is a self-cleaning shoe, and will not "ball up." Equally good for summer or winter use. Will prevent horses from "calking" or growing corns. Can be resharpened as readily as an iron shoe.

OPINIONS.

I do not hesitate to give it as my opinion that it combines more excellences than any I have before seen. It provides a solid base under all circumstances, for the horse while standing or traveling; has no rocking motion while the animal is turning, and possesses eleven calks to protect him from falling. I have never seen the inventor of this improvement, but I desire, in the interest of the noblest animal living, to thus thank him for the good his shoe is likely to bring him.

HENRY BEEGH,

President the American Society for Prevention of Cruelty to Animals, New York.

OFFICE OF NORTH CHICAGO CITY R. R. CO., CHICAGO, Feb. 16, 1881.
CHICAGO STEEL HORSE SHOE CO.—GENTS: We are using your "Dunning Steel Horse Shoe" on our car horses, and find they last us from three to four months before being worn out. We drive our horses about 16 miles a day—half over cobble stones and balance pavement. We consider them the best shoe made. M. W. SQUIRES, Supt.

Nos. 56 to 68 W. VAN BUREN ST., CHICAGO, Feb. 26, 1881.
CHICAGO STEEL HORSE SHOE CO.—GENTS: I have used the Dunning Steel Shoe on my horses with great satisfaction. I regard it as the most practical and valuable improvement yet made in Horse Shoes. I am sure they will commend themselves to owners and shoers. Yours truly, A. W. KINGSLAND, Secretary Northwestern Horse Nail Co.



PAWTUCKET, R. I.,

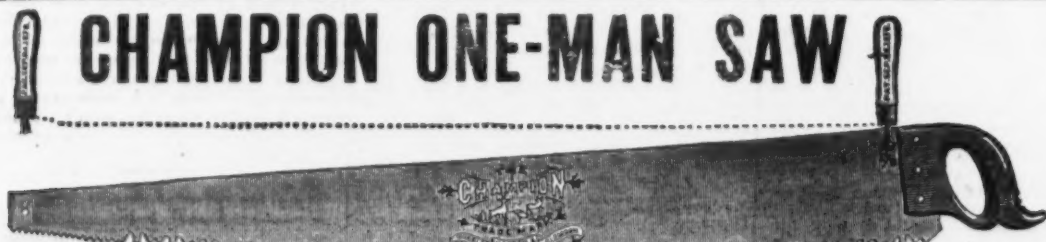
MANUFACTURERS OF

FILES AND RASPS.

ESTABLISHED 1863.

Capacity 1000 dozen per day.

GOODS WARRANTED TO GIVE SATISFACTION.



WITH PATENT ADJUSTABLE ATTACHMENT. The only Saw that can be adjusted for either a One-Man or a Two-Man Saw. We make the following lengths, 3 1/2, 4, 4 1/2, 5 feet. Send for sample.

WHEELER, MADDEN & CLEMSON MFG. CO., Middletown, N. Y.

HARVEY W. PEACE, VULCAN SAW WORKS

BROOKLYN, E. D., N. Y.,

Manufacturer of First Quality

HAND, PANEL, AND RIP SAWS,

AND KINDRED GOODS;

Also, MILL, CROSS-CUT AND CIRCULAR SAWS.

BAND SAWS A SPECIALTY.

HOOSIER SAW WORKS.

W. B. BARRY, Indianapolis, Ind.

Circular Saws.

I use none but best refined cast steel, selected. All saws subjected to a careful examination before shipment.

A trial of our goods will satisfy the purchaser of their excellence. Send for catalogue.



Escutcheon Pins, Small Rivets and Screws,

And Specialties in this line made to order by

BLAKE & JOHNSON,
WATERBURY, CONN.

UNITED STATES SMELTING WORKS,

MANUFACTURERS OF



BABBITT AND TYPE METALS,

Brass Castings and Solders of all Kinds.

PIG AND BAR TIN.

PIG AND BAR LEAD

Pig Brass and Copper, Spelter, Antimony, &c.

1615 & 1617 Spring Garden Street,

PHILADELPHIA.

GEORGE HUNT,

M. S. STOKES.

Gentlemen.—This cut illustrates our

CAST IRON

Furnace Lamps

which are superceding entirely the Tin Lamps wherever introduced, in consequence of their durability. They are now extensively used in the Iron Districts of Ohio and some in Pennsylvania. We call your attention to and solicit your order for them, confidently asserting that they are an No. 1 article in every respect.



Sample sent if desired.

PRICE, \$12 PER DOZEN.

Taylor & Boggis,
CLEVELAND, O.



C. W. DUNLAP & CO.,
85 Chambers St.,
NEW YORK,

Manufacturers of
GARDEN TOOLS

AND
Housekeeping Hardware
P. O. Address, Box 2705.

THE AMERICAN MACHINE CO.,

MANUFACTURERS OF

HARDWARE SPECIALTIES.

Office and Factory: Lehigh Ave. and American St., Philadelphia. Branch House: No. 128 Chambers St., New York.
SPECIALTIES: Fluting Machines, Hand Fluters, Plating Machines, Christmas Tree Holders, Bickford Portable Pump, Mrs. Potts' Patent Cold-Handle "Crown" Irons, Ice Cream Freezers and Cake Mixing Machines.

Slow Burning Roofs and Floors.

The accompanying illustrations, from the circulars of the Boston Manufacturers' Mutual Fire Insurance Company, are of special interest, as giving precise details in regard to an improved method of construction—namely, the slow burning, which might be, perhaps, more properly called fire-proof than the usual iron construction which has received that name. The roof itself is probably the most novel and striking feature in the design. The timbers are split or single, as the case may be, the aggregate width being 10 inches and the depth 12 inches. On top of this is laid a covering of 3-inch plank. The outside covering is either metal or any of the approved compounds. The company in their own practice use 2½ inch as well as 3-inch plank. This apparently excessive thickness of plank is essential to safety, because there is always a very much better chance to save property before a wood roof is burned through than afterward, and this great thickness adds to the time necessary for the flames to reach the open air.

finished with some ornamentation, and a railing is placed about the top. The plans are by Gen. J. C. Duane, engineer of the second lighthouse district. A hollow iron shaft in the center supports floors and deck; windows are provided, and the interior will be fitted up for the living rooms of the lighthouse keepers. All the work will be sent away from Boston in another week, and will be put up and ready for duty the present fall. The same parties are making another of the same kind, and from the same plans, for Stamford, Conn. The total weight of the cast iron for each of these two lighthouses will be 160 to 170 tons. They have just finished a lighthouse and pier for the Borden Flats, Fall River, which is now nearly erected.

American Art in Tools.

A Florence (Italy) correspondent of the New York Times has inspected the illustrated trade circulars of our American merchants designed for foreign markets, and

and working on a correct principle from the beginning, without blindly following it, but rather getting at its ideas and modes of working, and then giving full freedom to their own powers of invention and application. Our decorative art is cheap and nasty, and theirs cheap and lovely.

Work on the Brooklyn Bridge Steadily Advancing.

President Murphy, of the East River Bridge Company, speaks in vindication of those who have been charged with negligence in pushing that important structure to completion, and gives an encouraging statement respecting the progress of the work. The ex-Senator has daily inspected the structure, and had an opportunity to become thoroughly informed. He says:

The work has stopped apparently, but not in fact. The contractors are furnishing the steel as they have been doing all along. You must take into view the fact that this contract is unprecedented in its nature.

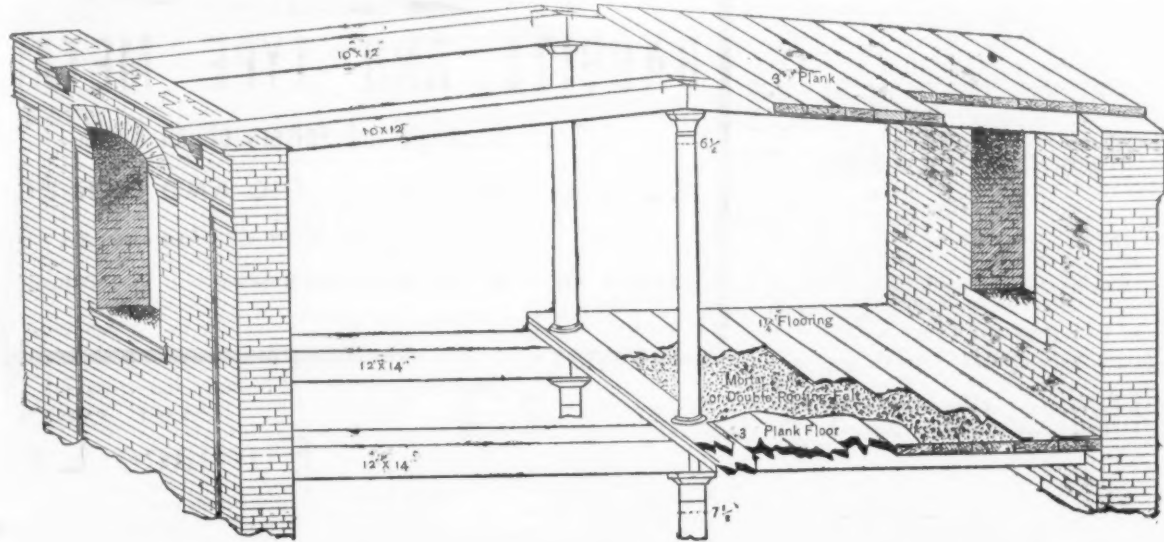


Fig. 1.—Perspective View showing Arrangement of Floor Beams, Rafters, Columns, &c., and Manner of Laying Floor.

SLOW BURNING ROOFS AND FLOORS.

When practically considered, it is found essential also to the stability of the covering, whatever it may be, to have a considerable thickness of wood on top of the so-called rafters. It keeps the upper room warm in winter and cool in summer, and at the same time checks what is so frequently an annoyance, condensation or dripping from the roof.

In Northern climates this thickness and strength of roof is not all unnecessary, since deep snows, especially if followed by light rains, as not unfrequently happens, will load the roof to a greater extent than a full complement of machinery in a cotton or woolen mill. In fact, it is estimated that the weight of a foot of snow would be nearly double that usually found on the weaving-room floor of a cotton mill. The 10 x 12 timbers are shown supported on iron columns, which are, for the upper floor, 6½ inches in diameter at the neck, and those for the floor below, 7½ inches in diameter. This construction is shown with considerable detail in Fig. 1, which represents an ideal section through a building constructed in this manner.

In Fig. 2, we have details of a very important feature in all mill construction, namely, an open cornice, which is made by allowing the timbers to project, their ends being formed into brackets. The common box cornice, whether of wood or of metal, is considered dangerous in the extreme by the company we have named, and as they rightly say, it is a useless cause of danger. The effect produced by an open cornice is good, as will be seen from the illustration.

The flooring, also, deserves mention. It consists, first, of 3-inch plank, which are laid upon the beams, spaced 8 feet from center to center, the spans not exceeding 24 feet, with timbers dimensioned as those shown in the cuts, 14 inches deep and 12 inches wide, either singly or split. On top of the bottom flooring plank, which is put together with tongues, we have a layer of roofing felt or of mortar, on which a layer of plank is bedded. This top flooring is of 1½-inch stuff. In Fig. 3, which shows a section of the flooring, a bead is used on the under side of the floor plank covering the joint. This supposes the planks to be of even width, and the bead covers the cracks which would be made by shrinkage. It should be nailed as shown, upon one side only. This finish is liked by many persons, as it relieves the flat surface. Floors made in this way are essentially fire resistant, and a long time is necessary for the fire, whether on top or beneath, to burn through to the upper surface so as to cause a draft. We think a foundry built with a roof as carefully laid as this, would be free from the complaints which so often reach us about the insecurity of such roofs and their frequent leakages. We have not at hand the figures of cost for this construction, but we imagine, when the durability and lessened insurance is taken into consideration, that this will be fully as economical as the more flimsy plans usually adopted.

New Iron Lighthouses.—G. W. & F. Smith, South Boston, are now finishing one of the two lighthouses being built for the United States Government. The one now erected is for the White Rock Light, off Beaver Tail, Narragansett Bay, where the steamer Rhode Island was lost. It is of cast iron, and consists of the foundation pier on three sections, 8 feet high each, 40 pieces in each section. The foundation pier is filled with broken stone cement, all solid. These 120 pieces weigh 100 tons. Upon the top of the pier is a four-section lighthouse, each 8 feet high, and one section 7 feet high, and upon the top of this is the lantern, 6 or 7 feet high. The whole affair is 69 feet high above the water line. The upper part is

received some new ideas of American art, of which he speaks as follows:

The finest art yet developed in America—one in which my countrymen excel all other peoples—is in a direction in which they themselves have never recognized or suspected. They have perfected it in its department simply because they have been governed by sound principles, joined to a keen consciousness of lines and forms, wedding sharpest practical use to completest beauty of its kind by unconscious pursuit of perfection—in a very limited direction, it is true, but one which forms the starting point for all others, highest art inclusive. I refer to our tools—the axes, hatchets, spades, shovels, hammers and other metal weapons, by which we hew, plant and conquer our virgin soil and tame it to our needs. So shapely are they, so nice their gradations of lines, so thoroughly adapted to their ends—graceful, light and strong, bright and cheery to look at, honest of purpose, sincerely made—that there is in them a touch of the aesthetic as well as the sense of the artistic, unmistakable as the repose and beauty of Greek art. Their makers have worked better than they knew, and nature has led them into art while thinking only of use.

Compare these plain, unadorned tools and their beautiful curves and outlines with the species of crass ornamentation, gilt or saw-cut, the gross realization of decoration laboriously wrought for defined purpose, in our machine-made furniture, organs, pianos, sewing machines, and the innumerable Yankee notions, good enough in themselves practically, but made hideous by the abortive attempts to make them beautiful as well. These tell the story of our defective aesthetic training, and what deformity is sure to result from attempts at ornamentation before the taste is sufficiently trained to distinguish artistic truth from falsehood. If the makers of these things would simply try to perfect them, keeping their objective aims strictly in view, following the example of the tool makers—and I can include in some degree makers of woodenware—they would produce far more artistic work in the end than they are now doing, with all their eagerness to recommend their wares by labored, overdone decoration. There is the slang of ornament, as ungrammatical and false as pigeon Chinese or backwoods speech, and tenfold more unnatural. We cannot make any substantial progress in industrial art until this whole haphazard system of decoration is thrown away, and we begin anew at the right end, i. e., learn the simple alphabet of art before trying to make eloquent speeches in its language. Years ago, when the material interests of the nation and its heart went oceanward, in seeking to build the fastest ships, our builders, following the hints of nature, and keeping their own aims steadily in view, succeeded in producing the most beautiful vessels possible—perfections of marine architecture, complete works of art, the like of which the world seems destined never again to witness. This was the result of knowing what they wanted and perseveringly studying means to ends, perfecting the ships as to character, and consequently as to comeliness, for even in material things the spiritual holds sway and begets beauty from truth of form. I honor these American tool makers as the serious pioneers of American art, unwittingly though it may be to themselves. There is the correct principle and right path of labor and progress. Thus the sight of a trade circular, with its fine cuts of American tools and its showy, tasteless pictures of pretentious furniture, organs, &c., has led me into this homily, which may not be without benefit to those interested in the ways and means of our aesthetic progress as a people. The Japanese have the finest sense of decorative ornament in detail of all peoples, simply from closely studying nature

There have been steel bridges of smaller dimensions, not involving any great amount of steel—among them, and the most famous of them all, the St. Louis Bridge, but the New York and Brooklyn Suspension Bridge is the greatest structure of the kind that was ever undertaken. It requires forms and shapes of steel of greater extent in themselves than ever known, calling for equipments that were not in existence in any steel works in the world. The contractors, the Edgemoor Iron Works, of Wilmington, Del., gentlemen of undoubted character, supposed, as did their competitors for the contract, that their plant, which was calculated for iron, would answer for steel, and they made their estimates accordingly. But their machinery was inadequate; it broke down, and was necessarily abandoned. The company then expended upon new machinery over \$150,000—a heavy percentage on a contract for \$500,000, calculated closely in competition. One of the most extensive steel manufacturers in this country says that this contract is unprecedented.

The contractors have gone on honorably with their work, notwithstanding the advance in the cost of iron, and since they have got their works in shape they have finished one half of the whole contract, supplying the steel at the rate of between 300 and 400 tons a month. They are continuing to furnish the floor beams, which are the index to the public of the progress of the work, but not the actual index. About one-third of the floor beams are yet to be put up. They are on hand, with the exception of less than 20, and before the 1st of November the public will see them in place. All the floor beams will be up before cold weather comes. I have said that the work has stopped apparently, but not in fact. The contractors have been busy finishing the posts and other parts of the work which will soon come in play immediately upon the completion of the suspension of the floor beams. We are not in so great a hurry that we can afford to have any part of this great work done improperly, and this fact is the key to certain changes that have been made involving delay. All parts of the bridge are progressing, and when the iron work is done the bridge will be done. It is the trustees' desire that in every part it shall have the imposing appearance that it presents in those parts that are nearest completion, and that the work as a whole shall be monumental.

The executive committee reported to the Bridge Company, on Monday last, that about 1000 tons additional of steel would be required to strengthen the structure, so that heavy railroad cars might be run over it with absolute safety, and the board voted to advertise for proposals for supplying the same.

In Sheffield, England, on the 3d inst., the spectacle was witnessed by a number of distinguished visitors, of rolling a huge steel-faced plate for a government war steamer now building. The process, known as the Ellis patent, was satisfactorily completed in a quarter of an hour. The weight of the plate was 30 tons 16 cwt., and the length 10 feet 4½ inches; breadth, 8 feet 9 inches; and thickness, 10 inches. Afterward the visitors witnessed the flanging of marine boiler ends by hydraulic pressure in one operation.

The Banque Transatlantique has been established in Paris for the purpose of facilitating commercial transactions, especially those in which the Compagnie Transatlantique is engaged. Its field of making advances on merchandise is doubtless one which had not been hitherto sufficiently covered in France.

The Amesbury Band Saw Filing Machine.

A very considerable item of expense in operating a band saw machine is the constant sharpening of the saws necessary. The saws being run at a very high rate of speed and doing a large amount of work in a given time, require constant attention in this direction to keep them in prime order. To sharpen a band saw, the length of which is from 12 to 20 feet, with an ordinary hand file is an undertaking of no small magnitude. Accordingly, many devices have been brought out for expediting this operation. The machine shown in our illustration has recently been introduced by Messrs. G. W. Amesbury & Co., of Philadelphia, and has some peculiar features worthy of attention. The machine has an automatic feed, which is self adjustable for any grade of teeth, and is arranged to feed in succession only the tooth that is to be filed. The file head is composed of two sections, one stationary and the other movable in the direction of its axis. The stationary section

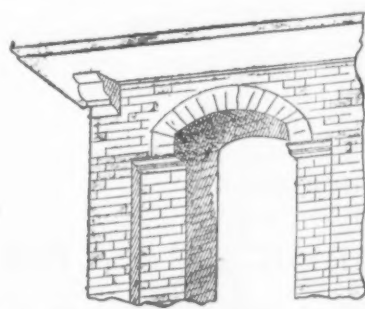
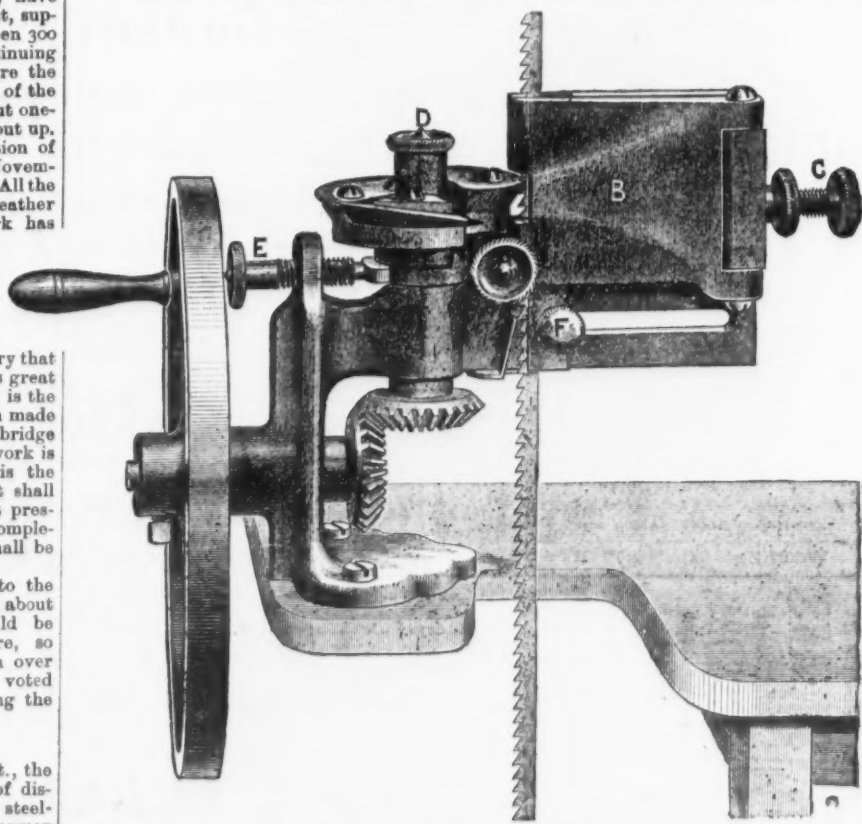


Fig. 2.—Substitute for the Old Box Cornice.



Fig. 3.—Detail of Floor.—Scale, 1-Inch to the Foot.

carries the feeder and a very thin segmental file, which is intended to file only the face and throat of a tooth. The movable section carries a thick beveled file suitable for the different grades of teeth, and rotates on a higher plane and files the back of the tooth, which has previously been filed on its face by the thin file, and at the same time cleans off the burr on the point of the tooth. This file is adjustable up or down, as may be required, by the thumb-screw D, thus adapting it to grade of teeth or to giving a desired pressure upon the back of same. The object of this construction is to divide the labor of the files and relieve the blade, and also lessen the strain occasioned by filing all parts of a tooth at one operation, and at the same time to get all the possible wear out of the files. The head carrying the files runs in an oblong bearing, which permits it to vibrate to and from the saw, to compensate for high teeth or any other irregularity. This head is provided with a pressure spring in the thimble E, which is adjustable. It is also provided with a spring and a head, which gives it an upward pressure against the face of the teeth. The saw is held in a clamping jaw, with the back resting against the gauge



THE AMESBURY BAND SAW FILING MACHINE.

F, which is readily adjusted to any width of saw by the screw C, and may be set at any angle. The clamping jaw is operated by a cam on the hub of the head, and opens and closes as the machine is feeding or filing. This jaw acts like a vise upon the saw when the files are in contact with the teeth, and immediately releases it when in contact with the feeder. The machine is adapted to band saws from 1-16th to 2 inches wide, and from the finest teeth made to three teeth to the inch.

Workmen are engaged putting in new heating and ventilating apparatus at the Custom House in Wall street.

INDUSTRIAL ITEMS.

MASSACHUSETTS.

The property formerly occupied by the Cape Ann Anchor Works, at Gloucester, is for sale.

The machinery, stock and tools of the Wakefield Shuttle and Needle Company were sold at auction on Tuesday last, the company deciding to retire from business. The sale was well attended, and good prices were generally realized.

Messrs. Graves & Kinney, of Holyoke, are doing a thriving business in the manufacture of brass and composition castings, pattern letters and babbit metal. They do all kinds of railroad brass work, but give special attention to fine castings. Both members of the firm are practical machinists, having been for some years in the employ of the Ames Mfg. Co.

The cotton compress recently constructed by Mr. George W. Grader, of Marblehead, for the Virginia Cotton Compress Company, of Norfolk, Va., is said to be the largest machine ever built in this country. The machine was completed by the Bridgewater Iron Company, of Bridgewater. Over 600,000 pounds of iron have been used in its construction. The motive power of the press is an upright compound engine of two steam cylinders, one of which is 80 inches in diameter, and the other 100 inches in diameter. These cylinders, located at the top of the machine, are 70 feet high, and are operated at a working pressure of 150 pounds to the square inch, which results in making the effective power of the compress 6000 tons, 3500 tons more than that of any other cotton compress now in use. This press is expressly designed for preparing cotton for foreign shipment. It is so arranged that two or three bales of cotton can be put together and occupy but little more space on shipboard than is required for a single bale compressed in the ordinary manner. This is the fourth compress furnished this company by Mr. Grader within the last six years.—Boston Commercial Bulletin.

The Ames Mfg. Co. have a contract with the Eldredge Sewing Machine Co. for the manufacture of the Eldredge sewing machine, and are turning out 75 machines per day. They are also doing a large business in the manufacture of machinists' tools, of which they make a specialty; their orders in this department are six months ahead.

CONNECTICUT.

Furnace No. 1 of the Barnum Richardson Co., at East Canaan, made last week 121 tons of car wheel iron, which is the largest quantity of charcoal iron ever made at any furnace in the valley in a single week.

NEW YORK.

The south furnace of the Crown Point Iron Company is in such good condition that relining will not be required. The north furnace will be provided with all the modern improvements, among others an annular bell, which, when it settles, will throw the ore to the center and sides of the furnace. It is expected that this furnace will make from 70 to 80 tons of iron a day. The south furnace has lately been making 53 tons a day. At one cast 18 tons of pig iron were manufactured in a single blast.—Boston Commercial Bulletin.

NEW JERSEY.

A wire rope, 60 miles in length, has been manufactured by the Roebling Sons, Trenton, for the towing of boats on the Erie Canal.

PENNSYLVANIA.

Cataqua Dispatch, September 17: The new mill of the Cataqua Mfg. Co. commenced operations on Friday last, and the machinery is now working very smoothly. The 10-inch train, with every appliance for

the manufacture of the smaller sizes of iron, is driven by a 50-horse-power engine, and is capable of making iron 90 feet in length. The mill is airy and fitted with every convenience and is an important addition to the works, enabling the company to meet the pressing demand for smaller sizes of iron.

On September 12th the Pennsylvania Steel Company's works, at Harrisburg, made the first blow with their new three-converter plant, each converter having a capacity of about seven tons. They now have five converters in operation, and can more than double their former production. The greater part of their product is made into rails.

The Neshannock Furnace, at Newcastles,

Cutlery.

FRIEDMANN & LAUTERJUNG,
Manufacturers of
PEN AND POCKET CUTLERY,
Solid Steel Scissors, Shears, Razors, &c.
Sole proprietors of the renowned full concave
"ELECTRIC RAZORS,"
And the celebrated "ELECTRIC SHEARS." Nickel Plated
Hows.
Agents for the BENGALL RAZORS.
AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.
91 Chambers and 73 Reade Sts., N. Y. 423 N. Fifth St., ST. LOUIS, MO.

THE

LAMSON & GOODNOW MFG. CO.,
Salesroom and Warehouse, 88 Chambers Street, New York City.
Factories, Shelburne Falls, Mass.
Superior Cutlery of all kinds and grades, from the finest in pearl and ivory handles to the lowest price in wood and iron handles.
OUR BUTCHERS' and HUNTERS' KNIVES
Are warranted to be equal in style, finish and quality, to any goods made in the world.
"COMPARE, THEN JUDGE."
We are the sole owners of the Gardner Patent Guard and Rest for Carving Forks, and the manufacture of fine carvers is with us a specialty.
AMERICAN MADE RAZORS
GUSHION BELT
OUR NEW PATENT COMBINATION RAZOR STROP. No. 230
J. R. TORREY, MANUFACTURER OF
STROPS
In all styles.
J. R. TORREY RAZOR CO., MANUFACTURERS OF
STROPS
To introduce we offer HOLLOW GROUND RAZORS at \$1.50, \$1.75, \$2; Ivory, \$2.50. Our SHED-1811 GEN RAZORS, \$1.75, \$2; Ivory, \$2.50. All our own make, and warranted the best cutters in the world. As razor makers we know what is needed to sharpen a dull razor, and will mail for 75 cts. a Strop warranted to set a fine edge to any razor. If in Morocco case, \$1.
Factories at WORCESTER, MASS. Catalogues to the trade.

BRADFORD & ANTHONY,
BOSTON,
IMPORTERS, MANUFACTURERS' AGENTS
AND WHOLESALE DEALERS IN
CUTLERY,
HAVE BOUGHT OF
JOHN RUSSELL CUTLERY CO.,
who have now ceased carrying stock in New York, the entire stock, comprising the full assortment of
TABLE CUTLERY,
Butchers', Hunters', Painters', Druggists' and Household Knives,
POCKET KNIVES,
Plated Ware,
which they have hitherto carried in New York. Included in this purchase are Many Specialties and various items which we can sell at
SPECIAL & ATTRACTIVE PRICES.
We shall in the future, as heretofore, be always prepared to fill orders at Manufacturers' Prices for all of John Russell Cutlery Co.'s Goods, as well as for all descriptions of
American and Foreign Cutlery.
WE INVITE THE ORDERS OF THE TRADE.
BRADFORD & ANTHONY, Boston, Mass.
JOHN WILSON'S CELEBRATED
BUTCHERS' KNIVES,
BUTCHERS' STEELS,
AND
SHOE KNIVES.
It having come to the knowledge of JOHN WILSON that Counterfeit Butchers' Knives, purporting to be of his manufacture, are being sold in the United States, he hereby cautions all purchasers of his Knives and Steels to be on the alert against such imposition.
JOHN WILSON also hereby gives Notice, that it is his determination to institute Legal Proceedings against any person or persons who may be detected infringing his Trade Mark.
Every article of JOHN WILSON'S manufacture, bears the Trade Mark, in addition to the Name.
WORKS:—SYCAMORE ST., SHEFFIELD, ENGLAND. Established 1780

TRADE MARK.
FOUR PEPPERCORNS AND A DIAMOND.
GRANTED A D 1766 BY THE CORPORATION OF CUTLERS OF SHEFFIELD AND PROTECTED BY ACT OF PARLIAMENT.
REGISTERED ALSO AT WASHINGTON U.S.A. ACCORDING TO ACT OF CONGRESS.
ALSO AT LEIPZIG, IN ACCORDANCE WITH THE GERMAN TRADE MARKS REGISTRATION ACT.

GIFFORD MANUFACTURING CO.,
Union City, Conn.
Manufactured of imported English Cast Steel.
Every Pair Warranted.
For samples and prices address,
GIFFORD MANUFACTURING CO.,
Union City, Conn.

The American Dynamo-Electric Machine,
For Electro-Plating, Electrotyping, &c.
Requires no Water.
Combining
all the
Latest
Improvements.
Cannot Reverse
Current.
ZUCKER & LEVETT, Genl. Agents,
Manufacturers and Importers of NICKEL PLATERS' SUPPLIES.
540, 542 & 544 WEST 16TH STREET, N. Y.

Cutlery.

CORPORATE MARK,
Joseph Rodgers & Sons,
(LIMITED)
CELEBRATED CUTLERY,
No. 52 Chambers Street, New York.
P. & W. CLATWORTHY, Agents.
The demand for Joseph Rodgers & Sons' productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam power.
To distinguish Articles of Joseph Rodgers & Sons' Manufacture, please to see that they bear their Corporate Mark.
P. O. Box 3902.
ESTABLISHED 1836.

Alfred Field & Co.,
COMMISSION MERCHANTS,
New York, Birmingham, Sheffield, Liverpool.
Guns and Pocket Cutlery,
SPECIALTIES.
Headquarters for
ELEY'S BROS' GOODS, WRIGHT'S ANVILS,
WILSON'S BUTCHER KNIVES, &c.
WOSTENHOLM'S POCKET CUTLERY AND RAZORS,
FIELD, FRASER & CONTINENTAL POCKET KNIVES,
BUTCHER'S FILES, TOOLS AND RAZORS,
JOSEPH ELLIOTT'S CELEBRATED RAZORS,
WESTERN FILE CO.'S FILES,
ENGLISH AND GERMAN GUNS,
ROBERT SORBY & SONS' SHEEP SHEARS,
STUBS' FILES, WESTERN FILES,
CHESTERMAN'S TAPES,
GERMAN COIL AND HALTERS and other CHAINS,
BRADEN'S TROWELS AND HOES,
CANASTOTA KNIFE CO.'S POCKET KNIVES,
Etc., Etc., Etc.
All sorts of Hardware and Merchandise for Import and export purchased on commission.
Silver Medal, 1878—Paris.

JOHN SPENCER & SON,
Albion Steel Works, Sheffield,
MANUFACTURERS OF
FILES
AND
STEEL,
Table Knives, Razors, Shovels, &c., &c.,
of every description.
CORPORATE MARK.
SPENCER
SHEFFIELD
Granted 1749.

FURNESS, BANNISTER & CO.,
NEWARK, N. J.
Manufacturers of
TABLE CUTLERY.
PRICES FURNISHED ON APPLICATION.

Office of
PHOENIX CASTER CO.,
Indianapolis, Ind.
Hibbard, Spencer & Co., Chicago, have sold our Casters as follows:
1879.....\$322.60
1880.....500.92
1881 (year half out only).....823.54
We have just issued a new Catalogue, which we would be pleased to mail with terms upon application.
PHOENIX CASTER CO.,
Manufacturers,
INDIANAPOLIS, IND.

TUCKER & DORSEY,
INDIANAPOLIS, IND.
U.S. PATENT
32 CHANCES
PERFECT DAY SAFE
TUCKER & DORSEY
INDIANAPOLIS, IND.
U.S. PATENT

MARTIN'S ENGLISH HORSE CLIPPERS.
Recommended as the best Hand Clipper made.
Extra pieces for sale.
J. J. Shannon,
1707 Market St.,
PHILADELPHIA.
Send for circular.

Cutlery.

McCOY & SANDERS,
Hardware, Cutlery, &c.,
P. O. BOX 390, NEW YORK.

Sole Agents for
THEILE & QUACK'S CELEBRATED CUTLERY.
WADE BROS. & TYLER & CO.'S CUTLERY.
IRVING CUTLERY CO.
ELMWOOD CUTLERY CO.
SHEARS, MIDDLETOWN SHEAR CO.
WROUGHT IRON TACKLE BLOCKS.
WADE'S DIFFERENTIAL PULLEYS.
PEUGEOT FRERES' FRENCH HORSE CLIPPERS.
SPECIALTIES.
WOSTENHOLM'S POCKET CUTLERY AND RAZORS.
WADE & BUTCHER'S RAZORS.
BENGAL AND GENUINE HAMBURG HOLLOW GROUND RAZORS.
JOS. RODGERS & SONS' CUTLERY.
GERMAN COIL AND HALTER CHAINS.
FLYERS, NIPPERS AND TOOLS.
CHESTERMAN'S TAPES.
Peugeot Freres' Horse Clipper.

ROBERT SORBY & SONS,
SHEFFIELD,
MANUFACTURERS OF THE CELEBRATED
Kangaroo Sheep Shears.
The best Shears Every Shears made. Guaranteed.
ALFRED FIELD & CO.,
93 Chambers St., - NEW YORK,
SOLE AGENTS.
Send for price list and terms.

GEORGE W. BRUCE,
1 Platt St., New York, Proprietor of the
Atlantic Screw Works,
And Agent for the
Florence Tack Co. and
C. A. Maynard
Maynard's C. S. Planters
Hilling and Box Blows,
Brady's Crown Planters and
Hilling; Elwell's Wooding
Planters and Grub, and a
variety of other kinds for
Home and Export Trade.
PHILA NOVELTY
MANUFACTURING CO.,
821 Cherry St., Philadelphia, Pa.
Patented
Hardware.
Horse Hay Forks,
Staple Drivers,
Brackets,
Glass Cutters,
Mining Knives, &c.
Send for catalogue.
American Mining Knife.
Pat. Feb. 11, 1879.
TELESCOPE TUBES.
Fine Mandrel-drawn Tubes, from Brass or German Silver. Tubes for sliding one within the other made to order. Manufactured by ROBT. F. DEAKIN & CO., 300 N. 15th St., Philadelphia, makers of the American Improved Brass Garden Syringe

A. G. COES & CO.
Established in 1839.
WORCESTER,
MASS.,
Successors to
L. & A. G. Coes,
Manufacturers of
THE GENUINE
COES
Screw
Wrenches.
PATENTED,
May 2, 1871.
December 26, 1871.
December 28, 1875.
August 1, 1876.
The backstrain when the wrench is used is borne by the bar—not by the handle.
The strongest Wrench made, and the only successful Re-enforced Bar.
None genuine unless stamped
A. G. COES & CO.,
Our Agents, GRAHAM & HAINES, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.

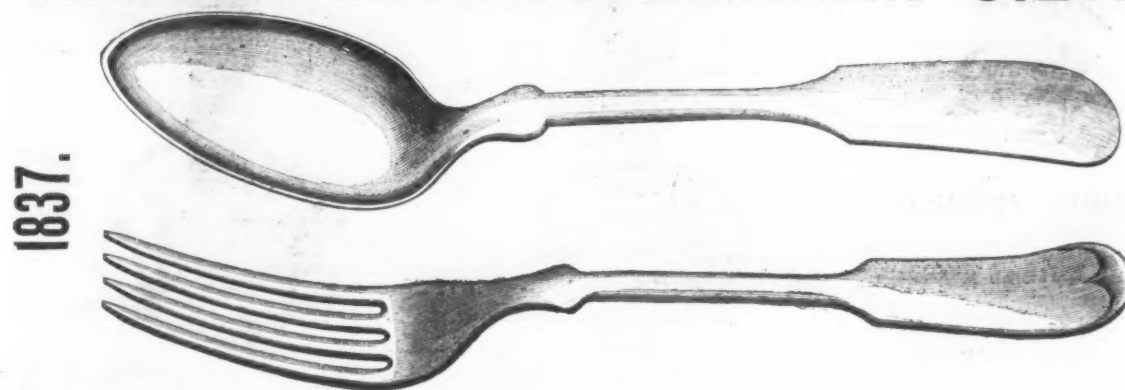
STANDARD
GIRARD WRENCH.
WARRANTED.
FOR
STRENGTH
AND
Durability
IT HAS
NO SUPERIOR.
GUARANTEED
IN
EVERY RESPECT.
Wrought Bar, Head
and Screw.
Owing to the increased demand for these justly Popular Wrenches, we are now manufacturing more than any other establishment in the world.
Our Wrench having been imitated by other manufacturers, we have adopted the above Trade Mark, and will hereafter stamp all our goods.
SEND FOR
TERMS AND PRICES
GIRARD WRENCH MFG. CO., Girard, Pa.

LANEBSON'S
PRICE BOOKS.
Full Leather, \$7.50. Half Leather, \$6.50.
Pocket Edition, Full Leather, \$3.50.
Bolt List, \$1.00.
Screw List, 50 cents.
Revised April 27, 1887.
Leigh's Discount Book, \$1.00.
Address all orders to **Fope & Stevens, General Agents,** 114 Chambers Street, N. Y.
For sale at publisher's prices by Wm. Blair & Co., Chicago; A. F. Shapleigh and Cantrell Hardware Co., St. Louis; C. B. James, Detroit.

GEO. H. CREED,
SHIP CHANDLERY,
103 Reade Street, New York.
Manufacturers of and Wholesale Dealers in
Cotton and "Long Flax" Sail Duck,
Cotton and Linen Havens.
Creed's Patent Ships' Clews, Heftman's Wire Rope Splicers, Agent for Raymond's American Crane Oil for Lubricating Cylinders and Valves.

CHAS. E. LITTLE,
59 Fulton St., N. Y.
Solid Cast-Steel Pump Augers
For Boring Pump Legs and Pump
Tubing, with all necessary fittings. Agency for
Barnes' Wood-Working Machinery
and Lathes.

HALL & ELTON'S GERMAN SILVER.



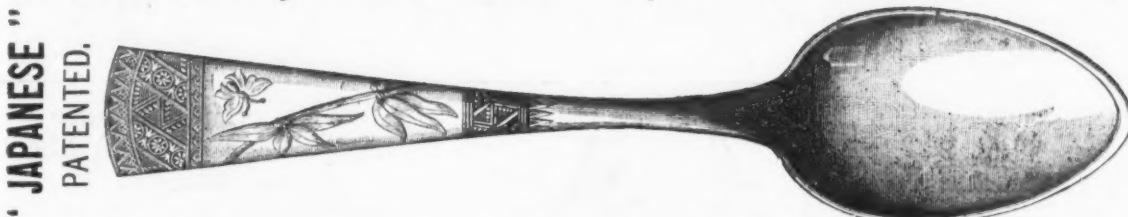
In addition to Spoons of this well-known brand, we are now prepared to furnish Forks of the same quality. We GUARANTEE these goods to be SOLID and of UNIFORM quality throughout, with no coatings to wear through or flake off, and with no liability to RUST.

HALL, ELTON & CO., Wallingford, Conn., and 75 Chambers St., New York.

HOLMES, BOOTH & HAYDENS,

MANUFACTURERS OF

Finest Quality Silver-Plated Spoons, Forks, Knives, &c.



NOTICE.—We guarantee the base of our Spoons, Forks, &c., to be full 12 per cent. Nickel Silver, and extra heavily plated with pure Silver. Our goods are all hand burnished, and are first-class in every respect. We pack our Spoons and Forks one dozen in each box.

49 CHAMBERS ST., NEW YORK. } Factories, } 18 FEDERAL ST., BOSTON.
WATERBURY, CONN.

T. G. CONWAY, 88 Chambers Street, New York,

Manufacturers' Agent for

REVOLVERS, BREECH-LOADING GUNS, TABLE CUTLERY,
CAST IRON, NICKEL PLATED & STEEL SHEARS.

Representing THE LEE ARMS CO.,
C. S. SHATTUCK,

THE GREENFIELD CO-OP. WORKS,
ATLAS WORKS,

J. K. RUPERTUS,
THE MILLVILLE SHEAR CO.

THE STANDARD WOOD TRACK HANGER OF AMERICA.

For Sale by the Wholesale Trade
Generally, or the

KIDDER SLIDE DOOR HANGER CO.

Sole Manufacturers,

ROMEO, MICHIGAN.



THE

"KIDDER."

THE HARTFORD HAMMER CO.,

Successor to THE HAMMOND HAMMER CO.,

MANUFACTURERS OF

SOLID CAST STEEL HAMMERS,

Adze Eye and Bell Faced Nail Hammers, Machinists' and Blacksmiths' Hammers.

The attention of the trade is called to this line of goods as superior in style, quality and workmanship to any in market. Lists furnished on application.

For Sale by C. E. JENNINGS & CO., 98 Chambers St., New York, and the Trade generally.



A. WYCKOFF, Manufacturer,
Chain Pump, Tube, &c.,
ELMIRA, N. Y.

Established
1855.

KEYSTONE WORKS. Centennial Award 1876.

GEORGE GRIFFITHS,

MANUFACTURER OF

Shovels,
Spades,
Scoops,
Coal Hods, &c.,

Nos. 511, 513 and 515 Locust St.,

PHILADELPHIA, PA., U. S. A.

Send for Price List.



leased by Oliver Bros. & Phillips, of Pittsburgh, is out of blast and is relining.

The Connellsville Coke and Iron Company have fired 40 coke ovens, and expect to have a total of 200 completed and in operation by November 1. The stonework for an additional 200 will be completed this fall, and if the weather will permit, they will be pushed to completion, but in the event of cold weather, their completion will be deferred until spring.

For the week ending Saturday, September 17, Phoenix Iron Company's blast furnace No. 3 made her best record, the product being 397½ tons of pig iron.

The No. 1 Furnace of the Crane Iron Works, this place, has so far advanced that it is now filled, ready for applying the match. It has been under construction for many months, and has been modeled with every convenience and appliance for making iron economically. It is 75 feet high, with 16 feet bosh, and has three Whitwell hot-blast stoves. No. 3, of a smaller pattern, is now making a good record, and No. 1, no doubt, will bring the product of the works to a higher figure. The contrast between the original No. 1 Furnace—erected by Mr. David Thomas, and the first successful anthracite furnace in America—is great. The heavy masonry of former years has given way to the neat-appearing iron casing, and the hydraulic hoisting apparatus is superseded by the steam hoist, which moves with a smoothness seldom encountered. The improvements at the Crane Iron Works the past few years are very noticeable, and, although the number of furnaces has decreased, yet the capacity has been largely increased.—*Catskill Dispatch*.

Artesian wells are fast gaining in favor with coke operators as a sure means of water supply during the dry season. The Overton Works is putting one down. They expect to go down a depth of 600 feet.

Spearman No. 1 Furnace, at Sharpsville, has been compelled to blow out on account of a salamander. As soon as this is removed and the furnace blown in, No. 2 will be blown out.

The work of hoisting the water at the Kehley Run Colliery, at Shenandoah, with which the mine has been flooded for months, began a couple of weeks ago. Since that time the water has been lowered about 4 feet, on the pitch, per day. At this rate the working in which the fire existed, and which was closed in, will be emptied about the middle of November. The other workings are also flooded and contain more water than the one in question. These, however, can be cleared of water in a comparatively short time. The water is hoisted in tanks which have a capacity of 1500 gallons. It is now an assured fact that the fire is extinguished, and the colliery will soon be put in working order.

PITTSBURGH AND VICINITY.

The firm of Read & Shaw, manufacturers of crucible cast steel, have dissolved partnership, and the business has been sold to the Gautier steel department of the Cambria Iron Company, and, pending the erection of new buildings at Johnstown and its removal thereto, will be carried on in its present location, in Allegheny City, by Mr. Charles H. Read, of the late firm.

We hear that ten new puddling furnaces are being erected at Oliver Bros. & Phillips' Fifteenth street mill, on the south side. The Superior Rail Mill, Allegheny, is operated in every department, excepting the rail department. The orders for railroad iron are being filled at the Homestead Bessemer Steel Works, where now 200 tons of steel rails are being made daily.

Soho Furnace, of Moorhead, McCleane & Co., has blown out for repairs.

Agnew & Co. have started up their glass works at Hutton Station and are running full time. They report trade good.

Mr. D. E. Park has retired from the firm of Park, Long & Co. The remaining members of the firm will carry on the business under the title of Long & Co.

The Pittsburgh Clay Pot Company, Allegheny City, are very busy and running full time. They make bricks of any shape and size to order for furnaces, and also supply all the kinds of clay used in glass works.

The new addition to the mill of the Mahoning Valley Iron Company, Youngstown, is going up rapidly. The mill is running double turn.

The Holt Mfg. Co., Cleveland, have doubled the capacity of their works, and have a liberal supply of orders for portable forges.

The Cope & Maxwell Company, Hamilton, write that the demand for all regular stock sizes of their pumps increases. They are adding plant tools and appliances to facilitate the filling of the already large number of orders on hand, and are now working, in addition to the day force, a night gang until 10 o'clock at night, and as soon as more workmen can be had they expect to run all night.

The new Champion Machine Company, Springfield, are running 14 hours a day, and are unable to fill their orders.

The Gill Gas Furnace Company, of Steubenville, have completed a furnace for A. J. Beatty & Sons, and will soon have completed the one they are erecting for the Ottawa Glass Company, Illinois.

The Akron Iron Company have orders on hand for all the hot-poured shafting they can make for three months, and only ask now to be let alone for a while, at least.

Brown, Bonnell & Co. are pushing the erection of their 38 new puddling furnaces. These will increase the number of their furnaces to 126. This firm one day last week made an output of 296 tons of finished iron.

The Alice Furnace, at Ironton, started up last week, and is making 45 tons daily, from native ores exclusively.

The Bellaire Goblet Co. have been running one furnace all along, and started fire in the other last week. They begin work this week. They report business as being moderately fair.

Messrs. Todd & Co., Youngstown, are building three large presses, each weighing 10 tons, on an order from a firm in Denver, Col. They are to be used in straightening steel rails. They are also building six 12 x 24 steam engines that have been ordered.—*Youngstown News*.

Whitley, Fassler & Kelley are building

the largest shops yet built in Springfield, for the manufacture of reapers, mowers and self-binders.

The Miller Company, Canton, are perfecting some new styles of steam pumps, which will soon be offered to the attention of the public.

The large addition to J. F. Seiberling's Mower and Reaper Works, Akron, is being pushed rapidly forward.

The shops of John A. Thomas & Sons, Springfield, are crowded with orders for engines of all classes. They are building three 100-horse-power stationary engines for Cincinnati firms. These shops have a world-wide reputation for doing the best work on their portable engines. M. Eugene Tyler is superintendent of machinery.

VIRGINIA.

The Potomac Iron Manufacturing Company, in Alexandria, have nearly completed their preparations, and it is thought that the manufacture of iron by the vapor fuel process will be commenced next week. But one furnace has been erected by the company so far, but Mr. William S. Moore is engaged in making castings for several others.—*Industrial South*.

The Vulcan Iron Works, Richmond, which were destroyed by fire on the 1st of June, have been rebuilt, and the machinery was put in motion on the 6th of September.

WEST VIRGINIA.

The Ensign Manufacturing Company, of Huntington, are constructing car shops. They have been for several years making car wheels, which industry has expanded from a capital of \$60,000 to \$260,000, and now they propose to build cars.

The Central Glass Company, Wheeling, are running all their furnaces now, and report trade moderately fair. Last week they made a large foreign shipment, part of it to Germany and the balance to Denmark.

ILLINOIS.

Fires were built week before last in both of the furnaces of the Ottawa Glass Co.'s Window Glass Works, and in the greenhouse of the Ottawa Bottle and Flint Glass Co.'s Works. In the Glass Co.'s greenhouse, fire will be built this week, and in the Bottle Co.'s flint house next week.

The Stove Works of Bonnet, Duffy & Co., Quincy, were almost completely destroyed by the tornado which swept over that city Saturday night last. Four men were killed. Comstock, Castle & Co.'s stove foundry was also nearly destroyed.

The Chicago Galvanized Wire Fence Company, licensed since January of the Washburn & Moen Company, of Worcester, Mass., filed a bill to-day in the Superior Court against the latter company, to be relieved from paying their license fees on barbed wire manufactured in part. The complainants allege the defendants have made a bargain to buy Haish's patent in Dekalb, Illinois, for a quarter of a million dollars, thereby violating the contract.

Chas. F. Elmes, of Chicago, manufacturer of general machinery, is furnishing the iron truss roofs for the Western Indiana and Wabash Railroad Elevators.

The F. C. Wells Pump Works, of Chicago, are furnishing a water works engine of great power (adapted for either fire or water purposes) for the Elgin National Watch Company, Elgin.

ALABAMA.

Mr. Bass, the car wheel maker, is doing some fine work at his blast furnace at Rock Run. With a 9-foot bosh he is producing 25 tons of iron each day.

GEORGIA.

The blast furnace at Barton, will, according to the *Chattanooga Times*, be removed to the latter city. The furnace is now the property of a syndicate of New York capitalists, under the title of E. P. Cook & Co. They are amply able to make all improvements and enlargements necessary to make the plant first-class in every respect.

WISCONSIN.

The Racine Hardware Mfg. Co., are employing 125 men 12 hours out of the 24. They have increased their output 25 per cent. this year, and will increase their facilities 25 per cent. next year. The foundations for a new brick building, 50 x 75 feet, three stories, as an addition to the works, will be commenced this fall. Their works have 65,000 feet of floor room.

The Whitaker Engine and Skein Company, of Kenosha, employ 40 hands in their works, which are run full time. New additions to the works, in the shape of a blacksmith and boiler shop, are in course of erection and will be finished by Nov. 1st; size, 45 x 60 feet. This company is unusually busy.

MICHIGAN.

The Cheeney Anvil and Vise Company, Detroit, has been reorganized with new and increased capital, removed to new quarters and gone to work with a will to fill orders accumulated for months past.

The Detroit Stove Company already find difficulty in filling orders.

The following table from the *Marquette Mining Journal*, exhibits, in gross tons, the total lake shipments of iron ore the present season, from the Lake Superior region, up to and including Sept. 28, together with the amount shipped during the corresponding period last year:

Where from.	1880.	1881.
Escanaba.....	911,593	1,085,035
Marquette.....	530,014	553,772
L'Anse.....	44,488	40,587
Total.....	1,486,095	1,679,414

An increase of 192,719 gross tons. In addition to this there was shipped pig iron, ore and quartz, as follows:

PIG IRON.	
Carp River Iron Co.'s furnaces.....	5,740
Pioneer Furnaces.....	1,802
Total pig iron.....	7,542
QUARTZ.	
Carp River Iron Company.....	4,647
Ore to local points.....	18,556
Total ore, pig iron and quartz.....	30,145

The Detroit Iron and Brass Manufacturing Company has been consolidated with works of a similar character at Elmira, N. Y., and henceforth all business for both concerns will be conducted from the latter place.

The Detroit Lubricator Company have gained a suit for infringement against the

LIGHTNING HAY KNIVES.

WEYMOUTH'S PATENT.



This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marshes.

The blade is best cast steel, spring temper, easily sharpened, and is giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for exports as well as home trade, and it seems destined to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each, of 50 pounds weight, suitable for shipping by land or water to any part of the world.

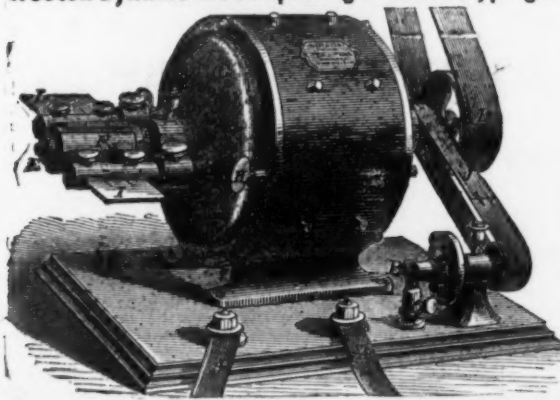
MANUFACTURED ONLY BY

HIRAM HOLT & CO.,

East Wilton, Franklin Co., Maine.

For sale by the Hardware Trade generally.

HANSON & VAN WINKLE, Sole Agents for

Weston Dynamo Electroplating & Electrotyping Machines, Newark, N. J.


For Nickel, Bronze, Brass, Copper and Silver Plating.

Over 1000 machines in use. Are used by all leading stove manufacturers. Experienced men sent to put up machines and instruct purchasers.

INFRINGEMENTS. We call attention to infringements of the Weston Machine in which Automatic Switches are used to prevent change of current. The Weston Co. are owners by grant or purchase of all forms of Automatic Switches for Plating Machines. The adoption of these machines will certainly lead to great loss to parties purchasing or using them.

MANUFACTURERS OF Cast Nickel Anodes, Pure Nickel Salts, Polishing Materials.

Manufactory, Newark, N. J. New York Office, 92 & 94 Liberty St.

Stanley Rule & Level Co.,

MANUFACTURERS OF

Factories
New Britain, Conn.

Warehouses,
29 Chambers St.,
New York.

Improved Carpenters' Tools.



Manufacturers of Bailey's Patent Adjustable Planes. General Agents for the sale of Leonard Bailey & Co.'s "Victor Planes." Manufacturers of "DeLancey" Patent Adjustable Planes.

DOUBLE REVERSIBLE CORN POPPER.

OUTSELLS
ALL
OTHERS.

Close

Prices
TO

Jobbers.



Double
The Size
OF
Common
Poppers.
—
Retail
FOR
25 Cents.

Wood Patent, April 14, 1874.

Made of Plated Wire, Durable and Handsome.

BROMWELL MANUFACTURING CO., Sole Makers, Cincinnati.

Agents: **W. H. QUINN & CO.,** 79 Chambers Street, New York.

THOMPSON McCOSH, Pres.

ROBERT DONAHUE, Treas.



HUNDLEY & HANKS,
PROPRIETORS OF

NORTH CAROLINA HANDLE CO.,


MANUFACTURERS OF

Handles and Spokes,

79 Reade Street and 97 Chambers Street, NEW YORK.
HARDWARE COMMISSION MERCHANTS.



PERSONAL INSURANCE

IN ALL BEST FORMS,

LIFE AND ACCIDENT.

'The Travelers,'

HARTFORD, CONN.

Cash Capital, - - \$600,000
Cash Assets, over - - 5,800,000
Surplus to Policy Holders 1,435,000

LIFE AND ENDOWMENT POLICIES

Of all safe and well-approved forms. Cash Insurance at low Cash Rates. Plain contract, ample security, prompt payment, and equitable surrender value.

Life Policies in Force, over 12,000
Claims Paid in Life Dep't, \$1,750,000

General Accident Policies

By the Year or Month, insuring against death by accident, or Weekly Indemnity in case of wholly disabling injury. Cost but little money, and written by Agents at short notice.

No. Accident Policies issued, 690,000
No. Accident Claims paid, 62,000
Amt. Accident Claims paid, \$4,375,000

LIFE AND ACCIDENT COMBINED,

Giving complete protection for life and limb under one contract. Costs about the same as ordinary mutual rate for Life Policy alone.

REGISTERED ACCIDENT TICKETS,

Insuring \$3000 against fatal accident, or \$15 a week for total disability, at 25 Cts. a day, or \$4.50 for 30 days. Sold at Railway Stations and at Agencies generally. Much used by travelers, but not limited to accidents of travel.

Money, Time, Life are lost by Accidents.

MORAL: Insure in The Travelers.

JAMES G. BATTERSON, Pres't.

Rodney Dennis, Sec'y.

John E. Morris, Asst. Sec'y.

New York City Office,

TRIBUNE BUILDING,

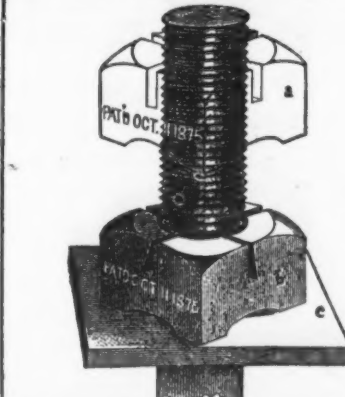
R. M. JOHNSON, Manager.

AGENTS NEARLY EVERYWHERE.

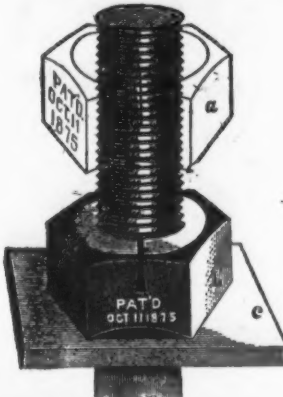
Apply to any Agent,

OR TO THE

Home Office, **HARTFORD.**



a. Atwood Nut on bolt without bearing on base—slots open.



b. Atwood Nut turned to bearing c, partially closing the slots, and grasping the bolt.

DEAR SIR: The past four years have demonstrated the practical value of the "Atwood Safety Nut." It was patented from Springfield, Mass., and first put to work in its own town by practical and conservative mechanics and engineers. Safety Nuts put on the Boston and Albany Railroad cars, in the year 1883, have never had occasion to be tightened; neither have the bolts ever been loose in their work. Safety Nuts put on the track of the Boston and Albany Railroad have exceeded the trackmen's expectations. Every mechanic will comprehend at a glance, that its workings are in harmony with all accepted mechanical laws and principles; i. e., the nut, instead of bearing in a straight line on the bolt (as the common one does) is, when turned home, forced towards the center of the bolt; and any strain on the bolt, after the nut is home, tends to act like the wrench turning it on. As the bearing corners of the nut being the highest—the top must incline towards the center of the bolt, clamping the bolt tightly. And the more strain on the bearing corners, the more resistance at the top. The nut will stand a barter turning from the wrench, without breaking the bolt, as it is elastic, while the common nut, being rigid, when it is brought to a bearing the thread must be overstrained in order to cause friction enough to stay to its place when first put on; and then, if any strain is put on it in the opposite direction, or between nut and head of bolt, the apexes of the thread are drawn over, leaving the nut loose on the bolt; or, if a Jam nut is used, the nuts will be found as when put on, but the bolt loose in its work. Remember, the "Atwood Safety Nut" never loosens, neither will the bolt loose in its work.

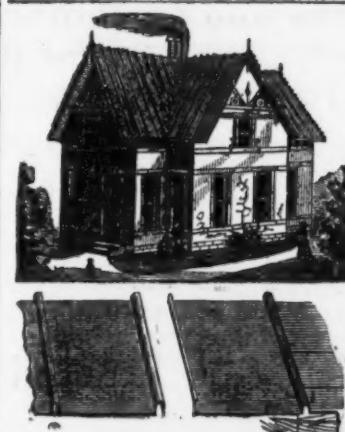
The Safety Nut is invaluable to every Railroad Company. Only one Nut is used. Its cost is less than the Jam Nut. The bolt is not required to be as long as when the Jam Nut is used. Time is saved in turning on and off; the bolt is always perfect and no loss of Nuts by jarring off along the road—thus saving money to those who use them.

The Boston and Albany Railroad were the first to use the Safety Nut, and are now putting it on to their ENGINES, CARS AND TRACKS.

We would respectfully refer you to the New York Central and Hudson River Railroad Co., New York. Also, Boston and Albany Railroad Co.; Wilson Eddy master mechanic; F. D. Adams, Supt. car department; W. H. Russell, chief engineer and road master; G. R. Hardy, Asst. engineer. Other large railroads are now using the Safety Nut, to whom we will refer if desired.

We would like to have you try the Nut, and we are certain you will use it afterwards altogether. Very respectfully yours, ATWOOD SAFETY NUT CO.

J. W. LARABEE, Sec. and Treas., OFFICE, ROOM 2, AGAWAM BANK BUILDING, Opposite Massachusetts House, SPRINGFIELD, MASS.



SAGENDORPH'S PATENT Self-Capping & Packed Sheet Iron Roofing.

OBELISK METALLIC PAINT

Under Sagendorph's Process.

For wood, iron, tin, brick and stone, and for all purposes where a fire or weather proof paint is desired. Iron roofs guaranteed five years not to rust. Obelisk Metallic Paint will stop leaks in all kinds of roofing, and will not crack, crack or peel off for a term of three to five years, according to the condition of the roof.

MANUFACTURERS AND OWNERS OF

Sagendorph's Obelisk Stone-Faced Canvas Roofing.

Important notice to steamboat and all kinds of boat owners that require or use canvas decks.

NEW YORK IRON ROOFING & PAINT CO.

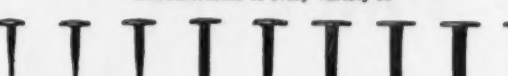
137, 139 and 141 E. Pearl Street, Office, Manufactory and Salesroom, CINCINNATI, OHIO.



ESTABLISHED 1856.

SHELTON & CO.,

Manufacturers of every variety of



TACKS & SMALL NAILS.

Carriage, Tire, Machine, Plow, Stove and Spring Bolts, Coach and Bed Screws, &c.

BIRMINGHAM, CONN.

Flagler, Forsyth & Bradley, Agents, 298 Broadway, New York.



THE KEYSTONE FAST SHACKLE JAIL LOCK

is a new and recently improved Jail Lock, there being as yet but few in the market. They are made of the best malleable iron throughout, highly polished and painted with English vermilion, and have 16 different changes, and are the best finished, the cheapest and best selling Lock in the market.

FLAGLER, FORSYTH & BRADLEY, Agents,
289 Broadway, New York.

American Tool Co.,

Manufacturers of

TOOL CHESTS OF ALL SIZES.

Adapted for the use of Boys, Youth, Gentlemen, Farmers, Planners, Carpenters, Railroads and Mines. Fitted up complete with a superior quality of Tools, and suited to the wants of the Hardware, Toy, Station and Variety trades. Export trade solicited, and a full stock of large-sized Chests always on hand. Quality considered, we think our goods will be admitted by buyers the cheapest that have yet been offered by any manufacturer in the United States or Europe. Illustrated descriptive catalogue furnished free on application with price.

MECHANICS' TOOLS AND HARDWARE SPECIALTIES, &c.

Warehouse and Salesroom, #16 Chambers St., New York, U. S. A.

Factories, 200, 214, 218 W. Houston St. near Varick.

PERFORATED SHEET METALS.

For Coal and Ore Separators, Revolving Screens, Jigs, Washers, Stamp Batteries, Mining and Smelting Works, Silver Reduction and Concentrating Works, &c., &c.

For Centrifugals, Brewing, Distilling, Wool and Sugar Machinery, Purifier Trays for Gas Works, Coal and Coke Works, Flour, Cotton, Oil, Paper and Pulp Mills, &c.

Iron, Steel, Copper, Brass, Zinc and other metals punched to any size and thickness, for all uses.

HARRINGTON & OGLESBY CO.

Nos. 43, 45 & 47, South Jefferson St., CHICAGO, ILL.

Special discounts to the trade. Correspondence solicited.

DE-OXYDIZED BRONZE.

DE-OXYDIZED BRONZE (patented) is an alloy of **LAKE COPPER** and best **ASIATIC TIN** in any proportion required, so as to be either as ductile as copper, as tough as iron, or as hard as steel, according to the proportion of Copper and Tin used.

The process of making the alloy is what constitutes its superiority over any other known alloy of Copper and Tin or any other Bronze composition. The castings made from this metal, owing to its perfect fluidity when melted, possess great density, perfect soundness and homogeneity. Unlike certain bronze and other compositions, it can be handled without the least difficulty by any ordinary founder, as it flows like oil in pouring.

Thus the necessity and trouble of shipping patterns, the delay in receiving castings and the expense of the double charges of freight or express, such as attend the obtaining, in many cases, of Phosphor Bronze, are entirely avoided by ordering **D. O. B. in ingots**. Where this metal has superseded other compositions of similar character, it has endured three times as long. In a word, we claim that **De-Oxydized Bronze** not only has none of the objectionable features attributed to similar compositions, but that it possesses all their good qualities in addition to its own merits, and advantages peculiar to itself, such as the following summary will make clear:

1. ITS GREAT CONVENIENCE IN HANDLING as compared to Phosphor Bronze.
2. We claim for it SUPERIOR ANTI-FRICTION QUALITIES to any other known Brass or Bronze.
3. GREAT MALLEABILITY AND TENACITY.
4. Its homogeneousness and smoothness of surface render it capable of the HIGHEST POLISH.
5. As before mentioned, we claim for it UNEQUALED ENDURANCE.
6. We claim that JOURNALS MADE of D. O. B. REQUIRE ONE-FOURTH LESS LUBRICATING MATERIAL than any other composition yet known.

Finally, this metal has never failed to give more than satisfaction wherever used. To sustain our statements, the following testimonials will suffice:

Henry Disston & Sons, Saw, Tool, Steel and File Works, Front and Laurel Streets,
Philadelphia Smelting Company, City:

GENTLEMEN: After a trial of eighteen months of your "DE-OXYDIZED BRONZE" as Journal Boxes in our Rolling Mill, where great pressure is required we take pleasure in recommending it as being superior to any we have heretofore used. Very truly,
HENRY DISSTON & SONS.

Office of Eagle Iron Works, 1162 North Third Street,

Philadelphia Smelting Company:

GENTLEMEN: In reply to yours of the 28th inst., we beg to say that we have been using your "DE-OXYDIZED BRONZE" for over a year, and have found it better than any composition boxes we have used; and as long as

you continue to make it the same quality, we shall use no other metal in our Engine Boxes. We therefore take pleasure in recommending it to Engine Builders in general.

Yours respectfully,

HOFF, FONTAINE & ABBOTT.

Office of Union Brass Manufacturing Company,

CHICAGO, Dec. 23, 1880.

Philadelphia Smelting Company, Limited, Twelfth and Noble Streets, Philadelphia, Pa.:

DEAR SIR: In reply to your inquiry of yesterday as to our opinion of "DE-OXYDIZED BRONZE" for Railway Coach Trimmings, I beg to submit that we have used it up to present writing for the trimming of something over 100 coaches. One marked peculiarity of this metal, when highly finished, is non-liability to abrasion, and its non-affinity with the gases of the atmosphere, which in embossed work is a great desideratum. To those willing to pay more in the first cost, we would confidently recommend "DE-OXYDIZED BRONZE" Trimmings as J. HALL DOW, President.

Yours very truly,

This metal is used for the following purposes, and we can refer to large concerns in addition to above, through the New England and Middle and Western States, who are using it in preference to any other.

1. Engine, Car and Machinery Journals.
2. Pumps, Valves and Linings, Cylinders, Pinions, Cogs, Plungers, Crank Pins, &c.
3. Car Trimmings, Harness and Coach Furniture, House Hardware, Steam Fittings, &c.
4. Wire, Sheets, Rods and Tubes.

And for any other purpose that a handsome, durable and sound Bronze is required. We especially commend it to Railroad Companies, Car Builders, Machinists, Engineers and others requiring a Journal Metal that will stand the severest friction and the heaviest pressure.

Manufactured and for sale in Ingots and Castings by the

PHILADELPHIA SMELTING COMPANY, Limited,

S. E. COR. TWELFTH AND NOBLE STS., PHILADELPHIA, PA., U. S. A.

GENUINE BABBITT.

Our Genuine Babbitt is superior to all other makes in the market in every particular. We guarantee it to be perfect in its Anti friction qualities in machinery AT A SPEED OF 10,000 PER MINUTE, or at 1000 TONS PRESSURE for 10 YEARS. We append below testimonials from A1 houses justifying us in the above claims.

New Haven, Conn., April 11, 1881.

We have used your "Genuine Babbitt" in our Challenge Rock Breaker with excellent results, and are pleased to testify to its merits for Journals, where high speed and great pressure are required.

BLAKE CRUSHER CO.

Worcester, Mass., April 21, 1881.

We have used your "Genuine Babbitt" about 4 years on our wood cutting machinery bearings, run at a speed of 9800 revolutions per minute, and always with entire satisfaction.

G. W. INGALLS & CO.

Worcester, Mass., April 23, 1881.

Having used your "Genuine Babbitt Metal" for over 4 years on machinery that runs over 9000 turns a minute, on 1 in. shaft, 3 in. journals, I can safely recommend it for all you advertise it to do. Any person wishing to see the machinery or wanting further information can call or address,

A. L. THOMPSON, Master Mechanic,
25 Hermon street.

From J. L. MARSDEN, Supt.,

FARRELL FOUNDRY AND MACHINE CO.,

ANSOVER, CONN., Aug. 17, 1880.

The "Genuine Babbitt" we have bought from you gives perfect satisfaction in our Stone Breakers. We have it working in bearings 12 in. long and 5 in. diameter. One-half the revolution of shaft there is a pressure of 900 tons. The other half 246 tons. The shaft makes from 200 to 250 turns per minute. I think this is a very severe test, yet they have been running for more than one year.

From WITHERBY, RUGG & RICHARDSON,

Manufacturers of Wood-Working Machinery,

WORCESTER, MASS., Nov. 23, 1880.

Send us 1000 pounds "Genuine Babbitt," divided into Bars, as usual. We think the continuance of our trade with you, in the face of the constant effort made by other parties to divert our patronage, is a sufficient recommendation of your goods. We speed some journals as high as 6000.

Yours truly,
WITHERBY, RUGG & RICHARDSON.

From this it will be seen that it can have no superior, or even equal, as an Anti-Friction Metal in anything manufactured. We make besides all grades of Anti-Friction Metals,

Letter A, Guaranteed at a speed of 2000.
Letter D, Used for Shafting.

Letter B, Guaranteed at a speed of 1000.
Letter E, Used for Ag'l Implements, &c.

Letter C, Guaranteed at a speed of 800.
Letter A L, For slow speed.

All our Metals are made from best Lake Copper, Asiatic Tin, Cookson's Antimony and best Refined Lead, and in all cases run free at melting heat, without drossing, and without any necessity for heating the journals into which they are poured.

MANUFACTURERS' AND MACHINISTS' NAME PLATES,

REAL BRONZE, FINISHED.

Patterns from \$3 upwards, according to Size and Style. Plates, \$3 per dozen and upward, according to Size and Style.

SKETCHES FURNISHED FOR APPROVAL BEFORE MAKING PATTERNS.

We have a specialty in this line and produce a handsomer plate, at less money, than can be obtained elsewhere.

ART AND ECCLESIASTICAL METAL WORK IN BRASS AND BRONZE,

GAS FIXTURES, ALTAR CANDLESTICKS, SANCTUARY LAMPS, CHANCEL RAILS, PULPITS, &c.

PHILADELPHIA SMELTING COMPANY, Limited,

S. E. COR. TWELFTH AND NOBLE STREETS, PHILADELPHIA, PA.

American Lubricator Company. The following is the decision, as Circuit Judge, of Hon. Stanley Matthews, now of the United States Supreme Court: "1. That the complainant's letters patent No. 191,171, dated May 22, 1867, for improvement in lubricators are good and valid, and that the defendants have infringed the sixth claim of said patent by the making, vending and using of lubricators embodying and containing the improvement described and claimed in said sixth claim, to wit: 'The combination with the oil and condensing chambers directly secured to each other, of a water seal pipe, the upper end of which connects with the condensing chamber, while the lower portion of the pipe descends into the oil chamber, and the lower end connects directly with a glass indicator, the ends of which are in free communication with the oil chamber.' That the complainant is entitled to recover, and that the defendants do pay over to the complainant, the defendants' profits to be accounted for, and in addition thereto the damages the complainant has sustained by reason of said infringement. 2. That the cause be referred to Addison Mandell, Esq., as special master to take an account and report to this court of the profits the defendants have made, and the damages the complainant has sustained by reason of said infringement by the defendants, and he is hereby invested with power to compel the production of the defendants' books, accounts, vouchers, &c., necessary to arrive at a correct statement of the account. 3. That the defendants do pay the costs in the cause to be taxed. 4. That an injunction do issue in accordance with the prayer of the bill, enjoining and restraining the defendants and each of them, their servants, agents, workmen and attorneys from any construction, sale, or use in any manner of lubricators containing said patented improvement. 5. Upon a filing of a bond on or before August 5, 1881, with two satisfactory sureties, in the amount of \$1000, to pay to the complainant the profits the defendants may receive, and in addition thereto the damages the complainant sustain by reason thereof, the defendants may have until September 10, 1881, not inclusive, but no longer, in which to dispose of the stock of manufactured goods they may now have on hand."

LABOR AND WAGES.

The De Stieger Glass Company, of LaSalle, Ill., have at work a number of German glass workers, who have been secured in Germany by one of the members of the firm.

It is stated that not only are the Zanesville (Ohio) mills running in spite of the union, but that they are running double turn with non-union men.

We are requested by the vice-president, First Division, First District, to state that there is no strike on the U. S. side of the Sligo Mill, Pittsburgh, with helpers, and any one wishing to work there can do so. The old helpers struck for an advance of 25 cents a day, contrary to the rules of the Amalgamated Association, and, failing to get back, want to declare the mill on strike. We have certain rules governing strikes, and they must be observed or suffer the consequences.—Amalgamated Association.

The heaters' helpers in the Clinton Mill, Pittsburgh, struck for an advance. The demand was acceded to, and the men resumed work the next day.

Dispatches from Savannah, Ga., are as follows: The strike continues and the men maintain a solid front. A train on the Central road brought in 150 laborers. The strikers gathered at the bridge and made a rush for the train, with the intention of driving off the hands. The police ordered them back, and, meeting with resistance, charged into the crowd. Five negroes were wounded (none seriously), and the crowd dispersed in every direction. A white man named John Calvin was shot in the shin in an encounter with a railroad employee.

In Philadelphia 240 stonecutters, workers in sandstone and marble, stopped work last week, their employers—representing all the large firms in the city—having refused to reduce the hours of the men from 10 to 9 hours a day. The granite cutters, not being in the Stonecutters' Union, did not strike. The strikers say eight hours a day is full time in New York and Chicago, and the pay is better than the \$3 a day which the Philadelphia workmen receive. A meeting of the Stonecutters' Union was held last evening.

The strike of the employees in the barge yards along the Monongahela River, which has been in progress for two weeks, seems to be nearing an end. The barge builders and boat sidlers, who demanded \$3 per day, have compromised at \$2.75, and will return to work this morning. The calkers and ship carpenters have been offered \$3.50, but think by holding out a few days more they will be able to obtain \$4 a day, the sum originally demanded.

Mr. Gould's large scheme for the Mississippi is being gradually carried into execution. Articles of incorporation have been filed in St. Louis for the consolidation of the New Orleans and Mississippi Valley Transportation Companies, with a capital of \$2,000,000, all paid up, the preliminary details having been arranged in New York, prior to their submission for approval by the stockholders.

The four electric lights on the tall pole in Madison Square, this city, do not give general satisfaction. When they were lighted for the first time, on Saturday evening last, it was a general remark that the upper lights were placed too high to be effective, and the reflectors were not arranged so as to properly distribute the light over the square; but these defects can probably be overcome.

An effort is making to secure a full representation of the shipbuilding interests of the country in the coming convention of the Industrial League. Mr. J. A. Norton, secretary of that organization, in a letter to Capt. Bates, of Chicago, proposes making a powerful appeal to Congress to inquire carefully into the condition of the industries of the country, and devise means to place them upon a sounder basis.

Special Notices.

New and Second-Hand MACHINERY.

One Horizontal Engine, 15½ in. x 30 in. Todd & Rafferty.
One Horizontal Engine, 3 in. x 6 in.
One Beam Corliss Engine, 500 H. P.
Portable Engines from 12 to 25 H. P.
Two Horizontal Return Tub. Boilers, 100 h. p. each.
One Horizontal Tubular Boiler, 6 ft. x 14 ft. 67 4 in. tubes.
Two Horizontal Tub. Boilers, 4½ ft. x 13½ ft., 43 4 in. tubes.
One Locomotive Steel Boiler, 30 h. p.

MACHINISTS' TOOLS.
Eleven Lathes, 22 in. x 12 ft. New.
Five Lathes, 18 in. x 8 ft. New.
One Lathe, 19 in. x 8 ft. Lincoln.
Five Lathes, 16 in. x 6 ft. Wood & Light.
One Lathe, 16 in. x 6 ft. Blaisdell.
Two 6-in. Shaping Machines. Gould's.
One Planing Machine, 36 in. x 8 ft.
One Milling Machine, No. 4. Wood & Light.
One Upright Drill, 36 inch.
One Burleigh Rock Drill, No. 4. New.
One Hotchkiss Compressed Air Hammer, 40 lbs.
One Pipe Cutting Machine.
One Styles & Parker Foot Press.
One Bliss & Williams Foot Press.
One Peck, Stow & Wilcox Foot Press.
One Cameron Steam Pump, No. 2.
One Knowles Special Pump, No. 7.
One 6 in. Tapping Machine. D. Saunders' Sons.
One Daniels Planing Machine.
One 100-ton Hydraulic Press and Pump.
One Root Engine.
One Pipe Cutting Machine.
One Pair Paper Rolls.
A large stock of Shafting, Pulleys, Hangers, Vises (Wrought and Cast), and other Miscellaneous Machinery.

J. GRAY'S MACHINERY DEPOT,
37 Day Street, New York, U. S. A.

Wanted.

\$3000 to \$5000 Working Capital
(with or without services), to work a valuable Magnetic Iron Ore Mine that will pay 50 per cent. on the investment. Only those with cash and meaning business address, MAGNETIC, Office of The Iron Age, 220 S. 4th St., Phila., Pa.

Wanted.

An Experienced Mechanical Draughtsman.

Address, THE BURDEN IRON CO., Troy, N. Y.

Wanted.

A competent man to take charge of a first-class charcoal furnace as founder. No application will be considered without good reference as to character, ability and experience.

Address, H., Office of The Iron Age, 220 S. 4th St., Phila., Pa.

Wanted.

In a Scrap Iron Yard, a man who understands weighing, handling men to advantage, and classification of Scrap. Address in own handwriting with full particulars, SCRAP IRON, Office of The Iron Age, 83 Reade St., New York.

Wanted.

An experienced entry clerk in a wholesale hardware house. References required.

Address, P. O. Box 96, New York City 11

Wanted.

A First-class Founder for a Coke Furnace.

Address, R. H. LEE, Supt., Lewisport, Pa.

WANTED.—By a practical Rolling Mill Manager, one thoroughly experienced in the manufacture of all kinds of malleable iron, especially that of plate and merchant iron, a situation as superintendent, or would take a good position as an assistant. Good references, if needed. Address, J. W. 557 Main street, Paterson, N. J.

WANTED.—Situation as Roll Turner. Experienced on all kinds of shaped and bar iron. Best references. Address ROLL TURNER, Office of The Iron Age, 220 S. 4th St., Phila., Pa.

WANTED.—Position as superintendent. Have occupied that position and contractor in a private armory for over 10 years. Is a practical machinist, tool maker and designer of special machines and tools for interchangeable work. Can give the best of references. DESIGNER, Office of The Iron Age, 83 Reade St., New York.

WANTED.—A second-hand Locomotive, saddle-back, weighing from seven to nine tons, 3-foot gauge. Address, C. H. SOUTHER, Box 3144, Boston, Mass.

A GENTLEMAN, 40 years of age, desires to make a connection with a manufacturing or mercantile house, as agent or manager of a branch store or any other responsible position. He is familiar with accounts, and can keep and audit books. Can render service to parties who wish him, and furnish first-class Boston references. Has no objection to living in another city. Please address, T. H. G., Room 3, Studio Building, Boston, Mass.

A YOUNG MAN wants a position as traveling salesman in a first-class Hardware House; with 16 years' experience in the General Hardware business. Address, Box 93, Lewistown, Pa.

A GERMAN ENGINEER, speaking English, many years manager of an important steel works in Germany, seeks a situation as manager for Bessemer, Siemens or Thomas steel manufacturing. Competent to establish and carry out works for the Thomas process. Highest references. Good testimonials. Replies to No. 40, THE IRONMONGER, 444 Cannon street, London, England.

TWO HARDWARE MANUFACTURERS.—Would like to represent a first-class concern in Chicago and the West. Am thoroughly posted in Hardware and have an extended acquaintance among the jobbers and No. 1 retailers of above places. Am an excellent salesman, and can work hard. Can furnish unquestioned references as to ability and ability among the trade here. Am holding a good position now, but wish to make a change. Address, G. A., Room 15, 15 Washington Street, Chicago, Ill.

REDUCTION IN PRICE.
JENNINGS' DISCOUNT TABLE.
(From 1 to 5 and all the combinations.)
We had them correct and wonderfully "labor saving."—Sargent & Co., New York.
"Your discount tables are all you claim for them."—T. W. Root with Russell & Birwin Mfg. Co., Toledo, O. Counting House Edition, post paid, \$1.13. Pocket Edition, Cloth Bound, " " " " 50. Pocket Edition, Paper Covers, " " " " 40. Currency may be sent by mail at publishers' risk. Address, R. H. JENNINGS, Deep River, Conn.

Special Notices.

FOR SALE.—Machinery in Store.

One 8 in. swing Drill Lathe 4 ft. bed, hollow spindles.
One 8 x 12 Portable Engine and Boiler.
Three 8 x 12 Stationary Engines, link motion, suitable for hoisting purposes.
One Cooper Steam Pump, 9 in. steam, 4 in. water, 14 in. stroke. The above are all second hand, re-fitted, and will be closed out cheap.

Wood-working Machinery, Knowles' Steam Pumps, Fan and Cupola Blowers, Exhaust Fans, Centrifugal Pumps, Harrington's Screw Hoists, Emory Gouges and manufacturers' supplies. The celebrated PHOENIX STEAM ENGINES, 15 to 50 horse-power. Second to none, and 20 per cent. cheaper than any others.

I. H. PRATT, 15 S. Water St., Cleveland, O.

NOTICE.

TO THE HARDWARE TRADE,

Retail and Wholesale.

Before buying, send to me for quotations. Will give special figures lower than market rates on a large line of Shelf Hardware and Tinware.

A. W. WHEELER,
141 Lake St., Chicago.

NOTICE!

SPECIAL SALE OF

CUTLERY.

SEE ADVERTISEMENT ON PAGE 18

OF

BRADFORD & ANTHONY, Boston.

Superintendent Wanted.

A man thoroughly competent to manage an establishment consisting of Machine, Pattern and Blacksmith Shops, and Iron and Brass Foundry, employing 75 men, manufacturing steam machinery, and doing general job work.

Address, JOHN M. MORGAN, Can. H. P. HARRIS, No. 3 Exchange street, Rochester, N. Y.

Wanted.

A Blast Furnace Founder who has had experience in the use of Anthracite Coal in Blast Furnaces.

Address, FOUNDER, P. O. Box 3465, New York City.

Wanted.

By an engineer of extensive experience, thorough knowledge, exemplary habits and satisfactory personal and professional credentials, a position as superintendent or manager of an iron or steel rolling mill. A thorough practical acquaintance with all departments of rolling mill work guaranteed. Address, MANAGER, Office of The Iron Age, 83 Reade St., New York.

Wanted.

A good practical mechanic, capable of taking charge of the inside work of a Bolt and Nut Factory. He must furnish good reference.

Address, LOCK BOX 1746, Youngstown, Ohio.

Wanted.

A Medium Sized Rolling Mill Building

In good repair. In answering advertisement give size, how long built, present condition and price asked. Address, T. R. MCILLER, 72 Washington St., Chicago, Ill.

Wanted.

A Good Second-hand 14 in. x 14 in. Vertical Engine,
Slide valve or cut-off.

Address, W. B., Office of The Iron Age, 220 S. 4th St., Phila., Pa.

Vertical Boring and Turning Mill

Wanted,

new or second hand, to swing 6 to 8 feet. State make, time of delivery, price, age, condition and where it can be seen.

Address, STOKES & PARRISH, 30th and Chestnut sts., Philadelphia.

Wanted.

To arrange with responsible parties having proper facilities and experience for the manufacture of some improved wood-working machinery, destined to meet extensive sales when thoroughly introduced. For further particulars, address

E. H., Office of The Iron Age, 83 Reade St., New York.

Wanted.

To manufacture by contract Light Machinery of any description; also, all kinds of Steel and Iron Drop Forgings and Dies. We have a full complement of machinery and tools for the above class of work. Call on or address, DANBURY DROP-FORGING AND MACHINE WORKS, Danbury, Conn.

Wanted.

An experienced man to superintend lead smelting, calcining and stack furnace process. Apply with reference, stating salary expected.

DESLOGE LEAD CO., Bonne Terre, St. Francois County, Mo.

Special Notices.

For Sale.

I have on hand for sale and ready for immediate delivery—One Engine Lathe, 28 in. swing, 10 ft. bed; One new 26 in. swing Column Drill, back geared, self-feed with quick return motion; one second-hand Engine Lathe, 24 in. swing, 24 ft. bed, good as new. Send for cut with description and prices to

W. W. COOKE, Toledo, Ohio.

For Sale.

IRON PLANER

12 ft. long, planes 37 in. square. Adapted for planing long shafts or engine beds. In good working order. Address

FULTON IRON & ENGINE WORKS, Detroit, Mich.

For Sale.

TWO WROUGHT IRON SHAFTS.

One 25 feet long, 15½ inches diameter.
One 17 feet long, 13 inches diameter.
Sketch of shaft furnished if desired.

WHITNEY & CO., 129 Camden Street, BALTIMORE, MD.

For Sale.

An old established manufacturing business paying a large profit on investment; only reason for selling, the parties wish to engage more largely in the iron business.

Address, 99 Ontario street, Cleveland, O.

For Sale.

320 Acres of Valuable Coal and Mining Land,

In the lower part of Ward township, Hocking County, Ohio, on a branch of the C. & H. V. R. R.

Address, W. D. CARTER, Newark, N. J.

For Sale.

The Industrial Works of Shamokin, owned and successfully carried on for a number of years by the late Wm. Brown, deceased, consisting of Foundry and Machine Shop, and a large stock of Patterns regarded as part of the property. Boiler Shop, Blacksmith Shop and Factory for the manufacture of heavy coal screens. Well located in the borough of Shamokin, Pa., with the best facilities for shipping by rail, and surrounded by a district contributing all the work that a shop of that kind can possibly turn out. The works are now running, but in a very short time possession can be given. Easy terms of payment are offered to suit a purchaser of limited capital.

Offered for sale by WM. McILVAIN & SONS, Reading, Pa.

For Sale.

One 20-inch Engine, one 100-horse Locomotive Boiler; two large Pulleys, 30-inch face; a 50-inch Rubber Belt, &c. All in good order, and will be sold for less than value to make room for larger.

Can be seen running at AKRON RUBBER WORKS, Akron, Ohio.

FOR SALE.

Eight H. P. Portable Hoister, J. S. Mundy; 80 H. P. Horizontal Engine; new Vertical Boiler, 48 in. x 10 ft., 124 tubes; 6 x 8 Double Engine, link motion; 12 in. x 12 ft. Lathe; 3-column Drill; Root Blowers, Nos. 1 and 2; 12 x 12 Vertical Engine, extra strong build; 6 Hangers, 2 7/8; 20-inch Drop; Copper-smith Shears, Heavy Platform Hoist.

A. G. BROOKS & WINEBRENER, 261 N. 3d St., Philadelphia.

FOR SALE LOW.—ENGINE.

A Vertical High-Pressure Steam Engine, complete, Cylinder, 24 in. by 48 in. Built by A. J. Sweeney & Son. Can be seen in daily use at our mill factory.

LA BELLE IRON WORKS, Wheeling, West Va.

MACHINERY ON HAND FOR SALE

One Horizontal Slide-Valve, Center-Crank, 20 Horse ENGINE (8 x 12); good as new, with Pulley and Fly-Wheel; has double-link motion; can be run in either direction. Price, \$200.

One Horizontal Slide-Valve, Center-Crank, 14-Horse ENGINE (8 x 12), with Pump, Heater, Pulley and Fly-Wheel, in good repair. Price, \$175.

One Horizontal Slide-Valve, Side-Crank, 25-Horse ENGINE, with 5-foot heavy End Wheel, Governor and independent Pump. Price, \$350. In good order; used about two years.

One Horizontal Slide-Valve, Side-Crank, 15-Horse ENGINE (8 x 12), with Pump, Heater, Pulley and Fly-Wheel, in good repair. Price, \$150.

One Upright 20-Horse and 40-Horse Engines, 20 and 40 Horse Baxter ENGINE and BOILER; used five years; newly repaired. Price, \$400.

One Upright 20-Horse and 40-Horse Engines, 20 and 40 Horse Baxter ENGINE and BOILER; used five years; newly repaired. Price, \$400.

One Upright 20-Horse and 40-Horse Engines, 20 and 40 Horse Baxter ENGINE and BOILER; used five years; newly repaired. Price, \$400.

One Upright 20-Horse and 40-Horse Engines, 20 and 40 Horse Baxter ENGINE and BOILER; used five years; newly repaired. Price, \$400.

One Upright 20-Horse and 40-Horse Engines, 20 and 40 Horse Baxter ENGINE and BOILER; used five years; newly repaired. Price, \$400.

One Upright 20-Horse and 40-Horse Engines, 20 and 40 Horse Baxter ENGINE and BOILER; used five years; newly repaired. Price, \$400.

One Upright 20-Horse and 40-Horse Engines, 20 and 40 Horse Baxter ENGINE and BOILER; used five years; newly repaired. Price, \$400.

One Upright 20-Horse and 40-Horse Engines, 20 and 40 Horse Baxter ENGINE and BOILER; used five years; newly repaired. Price, \$400.

One Upright 20-Horse and 40-Horse Engines, 20 and 40 Horse Baxter ENGINE and BOILER; used five years; newly repaired. Price, \$400.

One Upright 20-Horse and 40-Horse Engines, 20 and 40 Horse Baxter ENGINE and BOILER; used five years; newly repaired. Price, \$400.

One Upright 20-Horse and 40-Horse Engines, 20 and 40 Horse Baxter ENGINE and BOILER; used five years; newly repaired. Price, \$400.

One Upright 20-Horse and 40-Horse Engines, 20 and 40 Horse Baxter ENGINE and BOILER; used five years; newly repaired. Price, \$400.

Special Notices.

JOB LOT.

ELEY BROTHERS'

GENUINE BLUE CARTRIDGE CASES,

Twelve Gauge.

The best paper shell in the market. For sale cheap. Supply limited.

ALFRED FIELD & CO., 93 Chambers St., N. Y.

HEAVY IRON WORKS WANTED.

An Eastern Manufacturing Company, doing a profitable business in heavy wrought iron structures, the manufacture and sale of which they control for the United States and Canada, wish to establish additional work, located in the West. South, Pacific Coast and Province of Ontario. Must have first-class freight advantages for receiving rolled structural and merchant iron. Address WM. O. DOUGLAS, Binghamton, N. Y.

For Sale.

The Little Schuylkill Rolling Mill,

at Milldale, Schuylkill County, Pa., near Port Clinton, on the line of the Philadelphia and Reading Railroad, consisting of a Merchant Bar Mill in complete running order, with a splendid water power sufficient to run the mill two-thirds of the year. Engines, Boilers, Foundry and Machine Shop, with Lathe for turning rolls, and all other appurtenances necessary to commence operation at once. Together with dwellings, stables and large tract of land, to be sold low if applied for soon. For further particulars address or apply to J. O. RICHARDSON, No. 232 Dock street, Philadelphia.

For Sale.

Two Corliss Condensing Beam Engines,

34 in. x 72 in. cylinders. Address, THE HARTFORD ENGINEERING CO., Hartford, Conn.

For Sale.

Stock of Hardware, Fixtures, and Good Will of the subscribers, in the city of Norwich, Conn.

Only one other hardware store. Population 21,000.

FULLER & PARISH, August 1, 1881.

For Sale.

Hardware Stock and Trade in Michigan.

Those wishing to buy a complete stock and fine trade, and in a beautiful place to live, will find a rare chance by addressing

Office of The Iron Age, 83 Reade St., New York.

For Sale.

Hardware Stock and Business.

Located in one of the best towns of Northeastern Pennsylvania. Stock clean and well assorted, suited to the requirements of the trade where located. Business of 30 years' standing. For terms and full particulars apply to JAMES S. KUHN, Towanda, Pa.

For Sale.

Ten Double Acting Power Punching Presses, A. order. Eight Single Acting Power Punching Presses, A. order. Most of the double acting presses are the No. 3 Waterbury Press; the single acting, No. 2. One large Bliss & Williams Punching Press. One hundred and twenty-seven Foot Presses in A. order most of them square slides. Address, THE GEORGE PLACE MACHINERY AGENCY, 127 Chambers and 103 Reade sts., N. Y.

For Sale.

Stock of hardware, stoves and implements, and store furniture, in one of the best towns in Kansas.

Address, HARDWARE, Box 366, Salina, Kansas.

For Sale.

SECOND-HAND DROPS AND LIFTERS

BEECHER & PECK, Lock Box 122, New Haven, Conn.

Trade Report.

Office of The Iron Age,
WEDNESDAY EVENING, Oct. 5, 1881.

The money market has ruled stringent through the entire week, the rate for call loans being forced up almost every day to a fraction above legal interest, and as the week closes the pressure is as severe as it has been at any time this season. Yesterday afternoon the commissions paid ranged from 1/32 to 1/4 of 1 per cent. per day. Naturally, large amounts are required at this season to move the crops West and South, but the situation is aggravated by speculators, who, by enhancing the prices of produce, check exports and importations of gold as well. The demand for money, however, is somewhat relaxed by the break in prices at Chicago, and consequent collapse of one or two of the leading operators. It is satisfactory to know that while money is tight in Wall street, it is sufficiently abundant through the country at large for all legitimate enterprise.

The foreign commerce of the port of New York for the past week shows that although the exports of domestic products were unusually large, they were exceeded by the imports of general merchandise, the money value of the former having been \$8,953,660 and of the latter \$9,402,591.

Bills on London are demoralized by the dearth of money, and business in bankers' and commercial is done at very irregular rates—\$4.78 1/2 @ \$4.79 1/2 for bankers'. The posted rates for bankers' sterling remain unchanged.

The London Times of to-day, in its financial article, says that in consequence of the withdrawals for Egypt and the apprehension that more gold will be taken for America, the rate of discount in open market is now 4 per cent., with every prospect that the Bank of England rate will go to five on Thursday. Despite this action, \$500,000 in gold was withdrawn on Wednesday, as reported, for New York. The Imperial Bank of Germany has raised its rate of discount to 5 1/2 per cent., and its interest on advances to 6 1/2 per cent.

The importations of specie and bullion at this port during the week ending Sept. 30 were \$829,550, consisting of \$815,275 in gold and \$14,275 in silver, as against a total of \$3,235,403 for the week ending Oct. 2 last year. The importations since the 1st of January and since the 1st of August compare as follows with the movement during the corresponding periods last year:

	Since January 1, 1881.	1880.
Gold.....	\$43,728,543	\$30,218,544
Silver.....	2,161,710	3,827,582
Total.....	\$45,890,253	\$34,046,126
	Since August 1, 1881.	1880.
Gold.....	\$15,104,286	\$28,244,777
Silver.....	407,782	703,775
Total.....	\$15,512,067	\$28,948,552

As was anticipated by all who have watched the movement of funds through the week, the bank statement of Saturday was very unfavorable, but the demands from the West and South for currency, and the absorption of money by the Treasury, exceeded expectations. The reported decrease in specie is \$5,341,200, of which it is believed at least \$3,000,000 have gone to the interior. In addition to the decrease in specie, the banks lost \$326,900 legal tenders. The banks' reserve is now \$2,756,025 below the 25 per cent. rule.

The stock market has suffered from the drain of money, affecting bank reserves and making it comparatively easy for the bears to establish lower prices. The greatest decline was on Monday and Tuesday, when the market closed at about the lowest point of the week. One effect was to depress Government bonds 1/4 @ 1/2, and to cause a heavy decline in all sorts of speculative securities. Lake Erie and Western was broken down in consequence of legal proceedings against the company. To-day a special drive was made at Mr. Gould and his Western Union Telegraph, which was pressed down to 83 per cent. Reading also declined from 74 1/2 to 69 per cent., due to the fact that Mr. Vanderbilt has probably accomplished his purposes, and that buying for control is at an end. As above noted, in comparing sales of stocks at the opening and close of the week, there is a decline on the entire list, the principal changes having been as follows:

New York Central, 3 1/4; Canada Southern, 3 1/4; Louisville and Nashville, 4 1/4; Pacific Mail, 2 1/4; Northwestern, 2 1/4; St. Paul, 3 1/4; New Jersey Central, 4 1/4; Delaware, Lackawanna and Western, 3 1/4; Delaware and Hudson, 2 1/4; Central Pacific, 3 1/4; Lake Erie and Western, 11; Peoria, Decatur and Evansville, 2 1/4; Lake Shore, 4 1/4; Wabash Pacific, 3 1/4; Wabash Pacific preferred, 4; Cleveland, Columbus, Cincinnati and Indianapolis, 4; Rock Island, 2 1/4; Chicago, Burlington and Quincy, 4; Union Pacific, 3 1/4; Michigan Central, 3 1/4; Illinois Central, 3; Ohio and Mississippi, 3; Hannibal and St. Joseph preferred, 4 1/4; Omaha, 3 1/4; Omaha preferred, 5 1/4; Texas Pacific, 3; Chicago and Alton, 3 1/4; Missouri Pacific, 2 1/4; Missouri, Kansas and Texas, 3 1/4; Denver and Rio Grande, 4 1/4.

Railroad and State bonds were irregular, but generally lower.

The exports of domestic products for the week were valued at \$7,537,795.

United States bonds to day declined 1/4 for

the 4 1/2s and extended 5s, 3/4 for the 4s and 1/4 for the extended 6s. The closing quotations were as follows:

	Bid.	Asked.
U. S. 4 1/2 1891 registered.....	112 1/4	113
U. S. 4 1/2 1891 coupon.....	112 1/4	113
U. S. 4 1/2 1897 registered.....	112 1/4	113
U. S. 4 1/2 1897 coupon.....	112 1/4	113
U. S. Currency 6s 1895.....	110 1/4	111
U. S. Currency 6s 1897.....	110 1/4	111
U. S. Currency 6s 1898.....	110 1/4	111
U. S. Currency 6s 1899.....	110 1/4	111
U. S. Currency 6s 1900.....	110 1/4	111
Five continued.....	100 1/4	101
Five continued.....	99 1/4	100

The following is an analysis of the bank totals of this week compared with that of last week:

	Sept. 24.	Oct. 1.	Comparison.
Loans.....	\$33,079,300	\$30,497,400	Dec. \$2,581,900
Specie.....	64,074,400	59,641,200	Dec. 4,433,200
Legal t'd's.....	1,057,200	773,300	Dec. 283,900
Total.....	\$38,210,900	\$36,911,900	Inc. 1,299,000
Deposits.....	314,317,300	308,518,100	Dec. 5,799,200
Reserve re-quired.....	78,570,125	77,129,575	Dec. 1,440,550
Surplus.....	1,462,275	2,750,025	Dec. 1,287,750
Circulation.....	19,765,300	19,859,100	Inc. 93,800
Deficiency.....			

MINING STOCKS.

The closing quotations for mining stocks are as follows:

	Bid.	Asked.
Amie.....	30	31
Alice.....	6.00	6.37 1/2
Alta Mont.....	1.50	1.60
Bechtel.....	65	66
Bell Isle.....	20	21
Bodie.....	8.00	9.00
Butler.....	2.75	3.00
Bassick.....	1.00	1.10
Bull Dora.....	60	61
Bonanza C.....	14	15
Boulder.....	15	16
Boston C.....	6.75	7.00
Big Pittsburgh.....	1.00	1.10
Bradshaw.....	5	6
Calaveras.....	14	15
Calidonia.....	1.40	1.50
California.....	1.00	1.10
Climax.....	37	40
Consolidated Imperial.....	16	17
Consolidated Virginia.....	2.50	2.55
Chrysolite.....	6.75	7.00
Cent. Ariz.....	2.00	2.10
Cherokee.....	1.55	1.65
Dahlgren.....	5	6
Eureka C.....	23.00	24.50
Findley.....	24.50	26.00
G. Placer.....	40	41
Granville.....	4	5
Goodshaw.....	15.00	16.00
Great Eastern.....	5.00	5.50
Green Mountain.....	70	75
Hulk.....	36	37
Hortense.....	2.10	2.25
Iron Silver.....	2.40	2.55
Lacrosse.....	24	25
Little Falls.....	1.45	1.50
Little Hill.....	2.25	2.50
L. Chief.....	1.35	1.50
Mariposa.....	1.50	1.60
Mar. Pref.....	8.50	9.00
Moore.....	98	99
Miner Boy.....	45	46
Nevada.....	60	61
Ori. and Mil.....	70	80
Robinson.....	13.00	13.75
S. Nevada.....	13.75	14.50
Silver Cliff.....	3.00	3.25
Silver King.....	1.35	1.45
Sutro.....	3.00	3.40
Spr. Val.....	3.00	3.40
St. L. and 4.....	40	45
St. L. 2 and 3.....	3.55	3.60
Tip Top.....	6.00	6.50
Union Con.....	13.00	14.00
Unadilla.....	8	9

GENERAL HARDWARE.

Business this week has been very active, and the tone of the market continues strong, with few changes in values. Foreign hardware is in fair request at unchanged figures. The demand for Nails, although fair, is not as active as it has been, but makers are very firm in their views and quote \$3.30 @ \$3.40 per keg for rod to 60d, according to size of order. Stocks in this market are fuller and better assorted than they have been of late.

Flaniger, Forsyth & Bradley, No. 298 Broadway, agents for Geo. Griffiths, of Philadelphia, advise us that owing to the increased cost of material he has advanced his price of Shovels, Spades and Scoops 10 per cent.

Durrie & McCarty, No. 97 Chambers street, have been appointed sole Eastern agents for the Forsyth Scale Company, of Youngstown, Ohio. They will carry a full line of their goods at their warehouse in this city, which they will offer to the trade at lowest factory prices. The Forsyth Scale Company was formerly located at Rochester, N. Y., and later at Waukegan, Ill.

The manufacturers of Augers and Bits and Chisels and Drawing Knives held their regular monthly meetings in this city to-day, and in both cases existing prices and terms were reaffirmed.

The Penfield Block Company, Lockport, N. Y., have issued a revised price list for Store and other Trucks of their manufacture, which we print below. This list is subject to discount 30 per cent. Henry B. Newhall, No. 105 Chambers street, is agent for these goods in this city:

TRUCKS.—WESTERN PATTERNS.

No.	Price each.
1. Box Truck.....	\$4.75
2. Store " Full Ironed.....	6.00
3. " " Full ".....	7.00
4. " " Full ".....	8.00
5. " " Full ".....	9.00
6. " " Full ".....	10.00
7. " " Full ".....	11.00
8. " " Full ".....	12.00
9. " " Full ".....	13.00
10. " " Full ".....	14.00
11. " " Full ".....	15.00
12. " " Full ".....	16.00
13. " " Full ".....	17.00
14. " " Full ".....	18.00
15. " " Full ".....	19.00
16. " " Full ".....	20.00
17. " " Full ".....	21.00
18. " " Full ".....	22.00
19. " " Full ".....	23.00
20. " " Full ".....	24.00
21. " " Full ".....	25.00
22. " " Full ".....	26.00
23. " " Full ".....	27.00
24. " " Full ".....	28.00
25. " " Full ".....	29.00
26. " " Full ".....	30.00
27. " " Full ".....	31.00
28. " " Full ".....	32.00
29. " " Full ".....	33.00
30. " " Full ".....	34.00
31. " " Full ".....	35.00
32. " " Full ".....	36.00
33. " " Full ".....	37.00
34. " " Full ".....	38.00
35. " " Full ".....	39.00
36. " " Full ".....	40.00
37. " " Full ".....	41.00
38. " " Full ".....	42.00
39. " " Full ".....	43.00
40. " " Full ".....	44.00
41. " " Full ".....	45.00
42. " " Full ".....	46.00
43. " " Full ".....	47.00
44. " " Full ".....	48.00
45. " " Full ".....	49.00
46. " " Full ".....	50.00
47. " " Full ".....	51.00
48. " " Full ".....	52.00
49. " " Full ".....	53.00
50. " " Full ".....	54.00
51. " " Full ".....	55.00
52. " " Full ".....	56.00
53. " " Full ".....	57.00
54. " " Full ".....	58.00
55. " " Full ".....	59.00
56. " " Full ".....	60.00
57. " " Full ".....	61.00
58. " " Full ".....	62.00
59. " " Full ".....	63.00
60. " " Full ".....	64.00
61. " " Full ".....	65.00
62. " " Full ".....	66.00
63. " " Full ".....	67.00
64. " " Full ".....	68.00
65. " " Full ".....	69.00
66. " " Full ".....	70.00
67. " " Full ".....	71.00
68. " " Full ".....	72.00
69. " " Full ".....	73.00
70. " " Full ".....	74.00
71. " " Full ".....	75.00
72. " " Full ".....	76.00
73. " " Full ".....	77.00
74. " " Full ".....	78.00
75. " " Full ".....	79.00
76. " " Full ".....	80.00
77. " " Full ".....	81.00
78. " " Full ".....	82.00
79. " " Full ".....	83.00
80. " " Full ".....	84.00
81. " " Full ".....	85.00
82. " " Full ".....	86.00
83. " " Full ".....	87.00
84. " " Full ".....	88.00
85. " " Full ".....	89.00
86. " " Full ".....	90.00
87. " " Full ".....	91.00
88. " " Full ".....	92.00
89. " " Full ".....	93.00
90. " " Full ".....	94.00
91. " " Full ".....	95.00
92. " " Full ".....	96.00
93. " " Full ".....	97.00
94. " " Full ".....	98.00
95. " " Full ".....	99.00
96. " " Full ".....	100.00

The Covert Mfg. Co., West Troy, N. Y., have issued a revised edition of their illustrated catalogue and price list, among new goods they show the Covert "O. K." Horse and Cattle Ties, Covert Lariat Tether and Picket Pin, Covert Driving Reins, Covert Weight Cord and Covert Hitching Cord. In their advertisement on page 30 illustrations of these goods will be found, to which we invite the attention of the trade.

Graham & Haines, No. 113 Chambers street, have just received from the printer's hands a new and enlarged edition of their illustrated catalogue and price list, showing the various lines of Hardware represented by them. The book contains over 400 pages, and the illustrations, paper, printing and binding are all first class. They have

in press a discount sheet to apply to this catalogue, which we print below, and a perusal of which will give a fair idea of the extensive assortment of goods that they offer to the trade.

October 5, 1881.

NO. 1.—DISCOUNT SHEET TO GRAHAM & HAINES' CATALOGUE, 1881.

All prices subject to change without notice.

Pages in 1881.

Catalogue.

Per cent.

11. Circular and Veneering Saws.....

12. Saw Mandrels.....

13. Gunner Cutters.....

14. Saw Gummers.....

15. Tilers and Boxes for Pit Saws.....

16. Pit and Whip Saws.....

17. Saw and Handies.....

18. Swages.....

19. Saw Sets.....

20. Setting Stake for Circular Saws.....

21. Side Fil.....

22. Saw Clamps.....

23. Wire Gauges.....

24. Wire Gauges.....

25. Saw Rods.....

26. Saw Rods.....

27. Saw Rods.....

28. Saw Rods.....

29. Saw Rods.....

30. Saw Rods.....

31. Saw Rods.....

32. Saw Rods.....

33. Saw Rods.....

34. Saw Rods.....

35. Saw Rods.....

36. Saw Rods.....

37. Saw Rods.....

38. Saw Rods.....

39. Saw Rods.....

40. Saw Rods.....

41. Saw Rods.....

42. Saw Rods.....

43. Saw Rods.....

44. Saw Rods.....

45. Saw Rods.....

46. Saw Rods.....

47. Saw Rods.....

48. Saw Rods.....

49. Saw Rods.....

50. Saw Rods.....

51. Saw Rods.....

52. Saw Rods.....

53. Saw Rods.....

54. Saw Rods.....

55. Saw Rods.....

56. Saw Rods.....

57. Saw Rods.....

58. Saw Rods.....

59. Saw Rods.....

60. Saw Rods.....

61. Saw Rods.....

62. Saw Rods.....

63. Saw Rods.....

64. Saw Rods.....

65. Saw Rods.....

66. Saw Rods.....

67. Saw Rods.....

68. Saw Rods.....

69. Saw Rods.....

70. Saw Rods.....

71. Saw Rods.....

72. Saw Rods.....

73. Saw Rods.....

74. Saw Rods.....

75. Saw Rods.....

76. Saw Rods.....

77. Saw Rods.....

78. Saw Rods.....

79. Saw Rods.....

80. Saw Rods.....

81. Saw Rods.....

82. Saw Rods.....</

Barcelona.			
Brass gals. 100	1	300	
Hdw., cse. 1	40		
Mach'y, pkgs. 68	2,000		
Emmouh.			
Ptln., gals. 5,000	800		
Naph., gals. 135,000	13,500		
Middleborough.			
Ptln., gals. 79,370	6,344		
Japan.			
Ptln., gals. 460,000	52,325		
Pig iron, tons. 65	1,365		
Sandwich Islands.			
Pumps, pkgs. 1	425		
Elstner.			
Ptln., gals. 140,600	11,500		
Antwerp.			
Mf. iron, pkgs. 63	3,930		
Ptln., gals. 867,800	65,410		
Ag. imp., pgs. 2	107		
Hdw., cse. 22	561		
Haver.			
Naph., gals. 475,564	43,160		
Clocks, bxs. 1	450		
Sew. ma., cse. 1	470		
Mf. iron, pkgs. 3	79		
Ptln., gals. 402,315	26,151		
Ag. imp., pgs. 45	4,039		
Pumps, pkgs. 9	1,200		
Hdw., cse. 1	200		
I. r. goods, cse. 1	160		
Les Sables D'Olonne.			
Naph., gals. 134,741	11,450		
United States of Columbia.			
Hdw., pkgs. 543	10,882		
Mf. iron, pkgs. 371	15,038		
Mach'y, pkgs. 371	15,038		
Ptln., gals. 970	1,446		
I. r. goods, cse. 23	1,325		
Wire cloth, cse. 1	79		

PHILADELPHIA.

Office of The Iron Age, 220 Fourth St., Philadelphia, Oct. 1, 1881.

Pig Iron.—The market has been somewhat inactive during the week, although the feeling is still one of confidence and strength. Mill Irons are probably a shade firmer, and there is not much difficulty in securing buyers at full prices for all good lots. The leading brands are still scarce, and, as we said last week, slightly higher prices would be paid if that would secure additional supplies. Foundry Irons have not gained anything during the week, and we notice a disposition to enter orders without insisting on the full prices previously mentioned. In point of fact, there are indications of irregularity, some descriptions of Iron being firmer, and others dull and inclined to weakness. Some think that this is due to the political position, others think a reaction at this time both natural and healthy, and still others are of the opinion that it is preliminary to another upward movement. Whatever the cause may be, it is reasonably certain that the advancing tendency has been arrested for the present, as offerings are larger, especially for future delivery, and the general market is more favorable to buyers than it was ten or fifteen days ago. At the same time, the position is a strong one—stocks light, production barely equal to consumption, and, according to recent advices, danger from foreign Iron is gradually decreasing. On the whole, it is probably safe to assume that there will be very little change for the present, although the market is sensitive, and liable to be influenced in either direction upon the slightest pressure. Sales during the week have been made chiefly at \$25 @ \$25.50 for No. 1 Foundry, \$22.50 @ \$23 for No. 2 Foundry and \$20.50 @ \$22.50 for Gray Forge. In some cases concessions have been made, and in others, for choice brands, higher prices have been realized.

Foreign Iron.—Middlesboro' Iron is dull and neglected, and no sales have been made for some time, so far as we can learn. No. 3 is held at \$19.50 @ \$20, which is entirely beyond buyers' views, although lower than present cost to import. Scotch Iron is firmer, but there is scarcely any demand. In small lots, Gartsherrie sells at about \$25, and Eglinton at \$22.50, but it would not be possible to move large lots unless at materially lower rates, notwithstanding the advance in the home market. Bessemer Pig is dull, with scarcely any demand at prices likely to lead to business. Advices from England report prices gradually stiffening under a strong home and Continental demand, but as American buyers bought largely before the advance, and are in no immediate need of supplies, they stand aloof from the market. Consumption is very large, however, and if makers hold out a few weeks longer, it is not improbable that American buyers will have to come in at market rates.

Blooms.—Prices are firm, and in some cases a shade higher, although quotations are nominally about as before—say: Charcoal Blooms, \$72.50; Run-out Anthracite, \$60 @ \$62.50; \$52.50 for Scrap Blooms, and \$47.50 for Northern Ore Blooms.

Muck Bars.—The market is firm, but buyers are not inclined to meet the extreme views of holders. A few small lots have been sold at \$43, and higher prices are asked, but business moves slowly at the advance.

Bar Iron.—There is little that is new to report, the mills, as usual, being full of orders and unable to meet all the demands made on them. The output during the week has been small, one day lost entirely, and, in consequence of the weather, only part time on other days. There are no indications of slackening in consumption, and prospects are in all respects favorable. Store price has been advanced to 2.8¢, and it is difficult to place orders at mill for less than 2.7¢, although 2.6¢ is the nominal rate. Business is likely to settle down to one of ordinary routine at present prices, the demand being large enough to keep the market steady, while increased production will probably stand in the way of any further advance.

Structural Iron.—The demand continues large, and manufacturers are doing their utmost to make deliveries on time. Most of the large concerns are very full of work, and there are more new orders on the market than can be easily handled. Prices are firm at last week's prices, say: Angles, 2.8¢ @ 2.9¢; Beams, 3.7¢; Tees, 3.75¢; and Channels, 3.8¢.

Plate and Tank Iron.—There is nothing of a character to change the tone of our

recent reports, the demand being large, mills full of work and prices firm. Some very good orders have been taken during the week, and others are ready to be placed as soon as it can be done at reasonable prices. We quote same as last week, viz.: Tank Iron, 2.25¢ @ 3.50¢; Refined, 3.75¢; Shell, 4¢; Flange, 5¢ @ 5.50¢; and Fire-box, 6¢ @ 6.50¢.

Sheet Iron.—No change whatever, the demand being very heavy and prices firm. We quote as before:

Common Sheet, No. 26 to 28	5¢
Common Sheet, No. 22 to 25	4 1/2¢
Common Sheet, No. 16 to 21	4 1/4¢
Best Refined 1/4¢ @ 1/2¢ advance on the above	
Best Bloom Sheets, No. 26 to 28	7¢
Best Bloom Sheets, No. 22 to 25	6 1/2¢
Best Bloom Sheets, No. 16 to 21	6 1/4¢
Common Red Plates, 1/16 to 1/8	3 1/2¢
Blue Annealed, 1/16 to 1/8	3 1/2¢
Best Bloom Galvanized, discount	35¢
Second quality, discount	45¢

Steel Rails.—There is a heavy demand and large transactions have been closed, both in American and foreign Rails. There is a feeling in some quarters that the heavy sales are due to concessions which have been granted to secure orders at once. Not that there is any scarcity of business, but the rapid development of capacity, as well as the aggressiveness of foreign manufacturers, makes it desirable to keep all the business at home that is possible. Hence it is not unlikely that orders with deliveries in the distant future have been taken on terms favorable to buyers. So far as has been made public, however, \$58 is an inside figure, with an advance of \$2 to \$3 on lots at an earlier date. A good many foreign Rails have also been sold, probably 30,000 tons, during the week, at prices equal to \$60 @ \$62.50, according to port and date set for delivery.

Steel Blooms.—There is an extraordinarily large number of inquiries for Blooms, and since date of our last report, probably 10,000 to 15,000 tons have been sold. For October shipment \$45 is asked, duty paid, but for later dates \$43.50 to \$44 would probably be accepted. A considerable quantity of German Blooms are offering, and quotations in sterling vary from £6. 2/6 @ £6. 7/6, according to make and date of shipment. This branch of business appears to be developing into one of great importance, and heavy sales are likely to be made in the near future.

Iron Rails.—The market is a little dull, although a few sales have been made during the week at what may be regarded as fair prices. Two or three good-sized lots have been taken at \$47.50, at mill, but there is no disposition to buy heavily. English Rails are quiet at about \$45.50, c. i. f., for 56¢; a lot of 35¢ are on the market at about \$48, but the market is not active.

Railway Fastenings.—Spikes are scarce and higher, and readily command \$3; Fish Plates, 2.5¢ @ 2.6¢; Bolts and Nuts, 3.25¢ @ 4¢.

Old Rails.—There are indications of activity, although buyers are still very timid. Any increase in the offerings or pressure to sell would be likely to affect the market unfavorably, but in the belief that stocks are much reduced, there is more disposition to buy at old prices. Sales have been made at \$28 for shipment, and it is said that more could be placed at the same figure, but an advance is asked. Store lots are held at \$27.75 @ \$28, but buyers are not inclined to pay over \$27.50, and would probably not take many at that price. Still there are indications of activity which may shortly develop into actual business.

Crop Ends.—A sale of 500 tons was made a few days ago at \$26.25, at Perth Amboy. They are offered at same price in Philadelphia, but buyers do not respond.

Old Car Wheels.—The market is dull, and there is no demand of any consequence. Choice makes are held at about \$30.

Wrought Iron Pipe.—The demand is large, and prices firm at 40¢ discount from list price for Boiler Tubes, and 7 1/2¢ @ 60¢ for Steam and Gas Pipe.

Scrap Iron.—Is firm, and choice qualities scarce. Sales have been made at \$23 @ \$29 for short and \$30 @ \$31 for long. Cast sells at about \$29 @ \$21.

Nails.—Stocks are light and under a good demand; prices are firm at \$3.40, less the usual trade discount.

PITTSBURGH.

(By Telegraph.)

Pittsburgh, Pa., Oct. 5, 1881.

At the regular quarterly meeting of the Western Iron Association, held in this city to-day, it was unanimously resolved to make no change in the card rate. The attendance was good.

Office of The Iron Age, 77 Fourth Avenue, Pittsburgh, Pa., Oct. 4, 1881.

The recent copious rains have broken the backbone of the drought in this section of the country, and not only has vegetation been revived, but there is a prospect of an early resumption of river navigation, which is badly needed, as the railroads have more business than they can get through with. The Fort Wayne and Panhandle roads, owing to a complete blockade, have stopped receiving at the West for this point, and the order will, no doubt, be continued until the embargo has been raised. Bessemer here is curtailed for lack of transportation, and it is evident that Pittsburgh must have another Western outlet, and the sooner the better.

Pig Iron.—There has been more activity developed the past week, sales of over 5000 tons having been made public, in addition to which there are several lots under negotiation, some of which will be consummated within a day or two. While it is true that some mills have from two to three months' stock in yard and bought to arrive, these are the exceptions and not the rule, and with cooler weather, so that the puddlers can work full time, there will be a largely increased consumption. And it is about as sure as anything can be that the quantity required from now until the close of the year will be very large. Furnacemen generally feel considerably stiffer in regard to price than they did a week ago. Some of the sales reported show an advance of 50¢ per ton, and the general belief now

is that prices are destined to go higher. Stocks in first hands are small, nearly all the furnaces in blast working on contracts made some time ago. We now quote Forge Irons at \$22.50 @ \$23, 4 mos., for that made from native ore, and \$23.50 @ \$24 for the product of Lake Superior ore. Sale of 700 tons of the latter at \$23.50, cash. Foundry grades remain unchanged and quiet, \$23 @ \$23.50, 4 mos., for No. 2, and \$24 @ \$25 for No. 1.

Bessemer Iron.—There has been an increased business within the past few days, and prices are firm, and 50¢ to \$1 per ton higher. Two sales have just been made public, one of 6000 and the other of 1000 tons, and both at \$28, 4 mos. It is very evident that the market here has been stimulated the past week by the favorable reports from across the water, and we should not be surprised to hear of sales before long at still higher prices.

Muck Bar.—There is still considerable inquiry, and, owing to the continued hot weather, the production continues short of the consumption; hence there is but little offering, and prices may be quoted firm at \$41, cash, and \$42, 4 mos. There was a sale of a special quality for immediate delivery at a higher price than we have quoted, but in a regular way it would be difficult to obtain a higher figure than that named above.

Manufactured Iron.—The continued hot weather is very much against the mills, as it keeps down their output, and thereby prevents them from meeting the demand made upon them; and between this and the railway blockade, buyers who have had their orders in for a good while and are anxious for the goods, are becoming very restless, and mill owners receive a good many letters hurrying them up. The railroad officials are also being closely pressed for more prompt delivery. It is thought that the recent rains will be followed by cooler weather, and if so, the mills will be able to largely increase their output. September was an unusually hot month. Prices firm at full card rates—2.50¢ for Bars, 4.20¢ @ 4.30¢ for No. 24 Sheet, 3.40¢ @ 3.50¢ for Tank, and 5 1/4¢ @ 6 1/4¢ for Boiler Plate, according to quality and brand.

Nails.—The advance established at the special meeting of the Western Nail Association last week was not looked for, as the demand had been steadily increasing for several weeks before, and then the price was lower, relatively, than that for any kind of finished iron. Inquiries are coming in from all directions, and it is very evident that makers will have all they can do until the close of next month, possibly the end of the year. We now quote at \$3.25, 60 days, with an abatement of 10¢ on carload lots, and the usual trade discount of 2¢ for cash.

Wrought Iron Pipe.—There never has been, possibly, such an inquiry for pipe in the history of the business; so pressed are some of the mills, that they are discouraging fresh orders, writing buyers that they can give no assurance in regard to time of delivery. Prices unchanged; discounts on Gas and Steam Pipe, 5 1/2¢ @ 60¢; Boiler Tubes, 40¢ off; Oil-well Casing, 8 1/2¢ per foot, net; ditto Tubing, 24¢.

Steel.—The Steel mills are all full of business, but there has been no change whatever in prices. Best quality of Refined Cast Steel, 11¢; ditto Crucible Machinery, 6 1/2¢ @ 7¢; Bessemer and Open-hearth Machinery, 5¢ @ 5 1/2¢; ditto Spring, 4¢ @ 4 1/2¢; ditto Plow, 4 1/4¢ @ 4 1/2¢; Steel Boiler Plate, the demand for which is steadily increasing, is firm at 6 1/4¢, and it is very difficult to get an order in for present delivery.

Rails, &c.—Steel Rails are firmer, and it is difficult to get orders in for near-by delivery, quotable at \$62 @ \$63, cash, at mill, for delivery this year, and \$60 and upward for next year. Railway Fastenings firm and in active demand. Spikes unchanged at 3¢; Splice Bars, 2.50¢ @ 2.60¢; Track Bolt, 3 1/2¢ @ 4¢.

Scrap.—Wrought Scrap is still quoted at \$28 @ \$29 per net ton for Ordinary and \$30 @ \$31 for Selected Railroad. Wrought Turnings are in large supply and dull; nominal at \$19 @ \$20. Cast Borings also dull and nominal at \$14 @ \$15 per gross ton; Boiler Plate, \$30 per net ton; No. 1 Scrap Metal, \$20 gross; Crop Ends, \$29 @ \$30 gross; Old Car Springs and Axles, \$37 @ \$40 net, according to quality.

Coke.—In one respect the situation is more favorable since the advent of the recent rains. There is not such a scarcity of water, which is an important factor in the making of Coke, but the scarcity of cars continues. No change in prices: \$1.60 per ton, free on cars at ovens, and \$1.70 @ \$1.75 for small foundry orders.

Window Glass.—There is an increasing demand, and the prospect is very encouraging for an active fall trade. Manufacturers are endeavoring to work up assorted stock, but it is slow work, the hot weather preventing a full production. Prices unchanged: Single strength, 60 and 10 and 5¢ discount; double strength, 70¢, for carload lots, 60 days; 2¢ off for cash.

Coal.—The prospect at the present writing is favorable for a coal-boat freshet, and there are some 8,000,000 bushels here ready for movement down the river as soon as there is water.

CHICAGO.

Office of The Iron Age, 36 and 38 Clark Street, cor. Lake Street, Chicago, Oct. 3, 1881.

Pig Iron.—The tone of the Pig Iron market is strong and healthy, with a good active demand. Dealers are firmly adhering to quotations given, which may be said to have an upward tendency. We quote for Lake Superior Charcoal, Nos. 1 and 2, \$31; No. 3, \$32; Nos. 4, 5 and 6, \$33 @ \$34; Calumet No. 1, \$27; No. 2, \$26; Crane X, \$29; XX, \$27; Thomas, \$26.50 @ \$29.50; Scotch Imported, \$29 @ \$30, 4 mos.; American Scotch, \$25 @ \$28, and Silvery Soft, \$24 @ \$26.

Manufactured Iron.—The demand for Manufactured Iron during the week has been very active, and market strong at the following quotations, which are an advance over our last report. We quote:

Bar, in store, 3¢; and at mill, 2.90¢; Angle, 3.80¢; 1, 4¢; Hoop at 3.80¢ rates; Sheet, Plate and Tank, 10 to 14 gauge, 4¢; 15 to 17 ditto, 4.30¢; 18 to 21 ditto, 4.60¢; 22 to 24 ditto, 4.80¢; 25 and 26 ditto, 5¢; and 27 ditto, 5.20¢. Stocks of all classes of Merchant Iron in store are light.

Nails.—The quotations on rod to 60d have been advanced to \$3.40 per keg in less than carload lots, and 10¢ off for the latter, with the usual discount for cash. The demand continues good.

Steel.—The market for Tool, Machinery and Steel for agricultural purposes still continues without any change. Prices are firm and demand good. We quote: Tool, 11 1/2¢; Machinery, O. H., 5 1/2¢; Crucible Machinery, 7¢; Hammer, 2 inches and under, 8¢; over 2 inches, 9¢; Cast Spring, 6 1/2¢; and O. H. Spring, Tire and Sleigh Shoe, 5¢. The quotations on this latter class of Steel would be shaded a trifle on large lots. Sheet, first, second and third quality, 12¢, 10 1/2¢ and 8 1/2¢, respectively; Crucible Plow, 6¢ @ 6 1/2¢; Eagle Plow, 5 1/4¢; Iron Center Plow, 10 1/4¢; and soft Steel Center Plow, 10 1/4¢.

Scrap Iron.—Demand moderate. We quote: No. 1 Forge Scrap, \$30; No. 1 Wrought, \$24; Heavy Cast, \$20, and Stove Plate, \$13.

CHATTANOOGA.

Office of The Iron Age, Market and 8th Sts., Chattanooga, Oct. 3, 1881.

Business has resumed the normal tone since the President's death and funeral. The reaction has probably aided somewhat in raising prices. The mere fact that there was nothing like a panic, a disaster predicted by many as a consequence of change of administration, has encouraged most traders to deal on a larger scale. All lines of production continue very active in this district, and no stocks accumulate at the factories, mills or furnaces.

Pig Iron.—There is nothing new in the market. Prices are steady, and the demand fully up to the capacity of the furnaces to supply. We quote: No. 1 Foundry, \$22 @ \$23; No. 2 Foundry, \$20 @ \$21; Gray Forge, \$18 @ \$19; White and Mottled, \$16 @ \$18; Car-wheel Metal, \$38 @ \$40.

Ores.—We quote: 50¢ Brown Hematite, per ton, \$2 @ \$2.75; Red Fossil, \$2 @ \$2.25, delivered at furnace.

Miscellaneous Articles.—Old Rails are steady at \$26 @ \$28 per ton, the demand being mostly for shipping; Wrought Scrap, \$20 @ \$25; Cast Scrap, \$10 @ \$15; Old Wheels, \$28 @ \$30.

Nails.—Nails are strong at the Pittsburgh advance, \$3.25 rates. Mills are sold well ahead, and anticipate a very prosperous fall and winter business.

Manufactured Iron.—Bar is in good request at \$27.50, and no pressure to sell. Railroad Spikes have advanced 15¢, to \$3.30, and are strong; Track Bolts, \$4.25, an advance of 25¢; Fish Plate, \$3, an advance of 25¢.

Coal.—We quote Lump at \$4.25; run of mine, \$2 at mills.

Coke.—Furnace Coke, \$3 at point of consumption; Foundry, 10¢ @ 12¢ per bushel.

Steel and Iron Rails.—Steel Bars, \$62 @ \$64 at mill; Iron, \$50 @ \$52; Small, \$57 @ \$60.

BOSTON.

OCTOBER 1.—The position of the Iron market is in effect the same as it was at the time of our last report. The amount of business done has been lighter than last week, but this is attributable to the general suspension of business in consequence of the death and funeral of President Garfield. The confidence in the position of the market is strong enough to cause it to remain firm, and the tendency of the market is undoubtedly upward, and buyers as well as sellers are of this opinion. The demand is still mainly for small parcels, and brands of either foundry or mill for immediate delivery are in light supply. Contracts for future delivery are taken only at the quotations at the time of the delivery. There is a good business expected by the furnacemen until New Year's, and higher prices are thought probable. Lower prices it is thought cannot be made before the close of navigation, and it is doubtful if they can be made then. The spook of foreign importations which so frightened the American dealers, seems to be most effectually laid by the recent advances in Iron in Great Britain which have made American Iron considerably cheaper than the foreign, and, in fact, furnished room for an advance here. American Pig—Prices are firm and higher, with an upward tendency. Prices at shipping ports are: \$25 @ \$26 for No. 1 X; \$22.50 @ \$23.50 for No. 2 X, and \$21 @ \$22 for Gray Forge. Small spot lots command \$2 @ \$3 per ton above these quotations. Foreign Pig.—The market has advanced since last week. The stock of Gleanbrook has been considerably reduced, and we quote \$24 on spot, and \$23 to arrive. We quote Eglinton at \$22.50 @ \$23; Langlois, \$25 @ \$26; Gartsherrie, \$24.50 @ \$25.50; Carbuore, \$23. Old Rails.—Are in good demand and have advanced to \$32 for American, and \$30 for Foreign. Manufactured Iron.—The trade in Manufactured Iron has been very good this week, though of course the death and burial of the President had a quieting effect. The demand for all classes has been as large as for some time past, and shows no evidence of any falling off, while we have to repeat the same story of how very light the stocks are; how hard it is to get Iron from the mills which are receiving more orders than they can possibly fill, and though now running at their full capacity are unable to supply the demand, and in fact are averse to receiving any more orders for Iron, and how dealers are compelled to refuse orders for want of sufficient stock, their being also no prospect of getting it. As we said last week the demand is greater than the supply, and that there is not enough Iron for the requirements in this country. The great firmness noted last week in Foreign Manufactured Iron still continues, and Bar Iron has advanced 5¢, and cannot be laid down here for less than \$26.60. The other classes for Foreign Manufactured will probably advance also. Under

these circumstances it is only a short time before Iron will advance here also. Bar Iron.—The bottom prices for Refined is \$2.60, and sales are reported at \$2.75. An advance is expected. Horse Shoes, \$4.25 @ \$4.33; Swedish and Norway at \$3.75 @ \$4 for Bars, and \$4.75 @ \$5 for Shapes. Plate Iron.—Quotations are firm, and the demand is very good. We quote Tank at \$3.35; Refined at \$3.45; Shell at \$4.10; Flange at \$5.10, and Tubes unchanged at 40¢ from list.

Sheet Iron.—The trade has been good and prices are firm. We quote: Sheet Iron, 4¢ @ 4 1/2¢; ditto Refined 5¢ @ 5 1/2¢; Galvanized, 8¢ @ 10¢; Russia, 11¢ @ 12¢. Steel.—The inquiry has been fair. We quote: Best English Cast, 14¢ @ 15¢; American do., 12¢ @ 12 1/2¢; Bessemer Machinery, 5¢ @ 6¢; Wedge and German, 7¢; English Spring and Calking, 7 1/4¢ @ 7 1/2¢; American ditto, 5 1/2¢ @ 6¢; Tire, 4¢ @ 4 1/4¢; Sleigh Shoe, 3 1/2¢ @ 3 3/4¢. Nails.—Trade is a little better than last month. There is a firm feeling with some sizes in light supply. We quote \$3.40 @ \$3.50 for 10d. per cask. Copper.—There have been no large sales, and the market is quiet but firm. We quote: Ingot Copper at 18 1/4¢ @ 18 1/2¢; Sheathing, 24¢; Braziers, 26¢ @ 28¢; Bolt, 26¢; Copper Bottoms, 27¢ @ 28¢; American Yellow Sheathing Metal, 17¢; Yellow Metal Bolt, 20¢; English Yellow Sheathing Metal, 14¢ in bond. Lead.—The market is very strong, but rather quiet. We quote: 5 1/2¢ in car lots and 5 3/4¢ in small orders; Bar, 7¢; Pipe, 7¢; Sheet, 7 1/2¢; Tin lined Pipe, 15¢; Tin Pipe, 35¢, all less 10¢. Zinc.—The demand has been good and we note an advance. We quote \$5.75 @ \$6 by the carload. Small lots \$6 @ \$6.25. Sheet Zinc is in short supply at 7 1/2¢ @ 7 1/4¢. Tin.—Tin has again advanced in London. The demand is good and the tendency is upward. We quote 21 3/4¢ @ 22 1/4¢. Large lots sell at 21 1/4¢; English, 23¢. Tin Plates.—The demand has been fair and prices are firm. We quote: Charcoal Bright at \$6.25 @ \$6.50; Terns at \$5.75 @ \$7.25; Cokes, \$5.35 @ \$5.55; ditto Terns, \$5.25 @ \$5.50.—Commercial Bulletin.

LOUISVILLE.

Messrs. GEO. H. HULL & Co., Commission Merchants, report to us as follows, under date of Sept. 30, 1881: There is a good demand for Iron, which for the last ten days has been met by furnaces, but at present nearly all the large furnaces South are sold so far ahead that they are declining to book further orders. Southern Irons have advanced 50¢ to \$1 per ton within the last week, and any considerable demand now would carry prices higher. No demand for Car-wheel Iron at present:

FOUNDRY IRONS.

No. 1 Hanging Rock, Charcoal	\$27.50 @ 28.00
No. 2 Southern, Charcoal	25.00 @ 27.00
No. 3 Hanging Rock, Stonecoal and Coke	22.50 @ 23.00
No. 1 Hanging Rock, Stonecoal and Coke	24.00 @ 24.50
No. 2 Hanging Rock, Stonecoal and Coke	23.00 @ 23.50
No. 1 Southern, Stonecoal and Coke	24.00 @ 24.50
No. 2 Southern, Stonecoal and Coke	23.00 @ 23.50
"American Scotch"	21.00 @ 21.50
Silver Gray	20.00 @ 21.00
Scotch	24.00 @ 26.00

MILL IRONS.

No. 1 Charcoal, Cold-short and Neutral	21.50 @ 22.50
No. 1 Stonecoal and Coke, Cold-short and Neutral	21.00 @ 21.50
No. 2 Stonecoal and Coke, Cold-short and Neutral	20.00 @ 20.50
No. 1 Missouri and Indiana Red-short	25.00 @ 27.00
White and Mottled, Cold-short and Neutral	18.00 @ 19.00

CAR WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold-blast	35.00 @ 41.00
Alabama and Georgia, Cold-blast	35.00 @ 38.00
Kentucky Cold-blast	35.00 @ 40.00
Hanging Rock, W. B.	25.00 @ 33.00

W. B. BELKNAP & Co., Iron and Steel Merchants, Nos. 113 and 115 Main street, report to us as follows, under date of Oct. 1: The Iron market is strong in all lines. Bars command at the mills readily from 1-10¢ @ 2-10¢ over the nominal card rate, and even at outside figures it is impossible to get sufficient quantity to replenish depleted stocks. Sheet Iron is still far behind the season's requirements. Manufacturers will not promise delivery of even the heavier numbers before November. Nails are buoyant, and some pretty heavy buying was indulged in by the trade just before the last advance to \$3.25 card, the certainty of which transpired before the meeting. Stocks are extremely light, and much to the surprise of jobbers at large, the mills have no surplus to help out with. The advance in Galvanized Sheet seemed warranted by the demand as did that of Wire. Business continues better than was anticipated. During the past week the combined attractions of low rail rates, exposition, fair and races brought many strangers to the city. Railroads are overcrowded with freight. There is virtually a blockade on O. and M., and the I. M. and I., owing to lack of depot room and force to handle freight arriving and offering.

ered \$1,000,000 for the Jamel property, just below Inwood, as a site. W. A. Cole, M. Bates, J. J. Potter and Thomas Rutter are mentioned among those concerned in the movement.

WHY THE GRIFFIN SCROLL SAW BLADES Are the Best in the World.

1. They are the strongest.
2. They cut fastest.
3. Each tooth has a "set."
4. They will turn a sharper corner.
5. They cut the smoothest.
6. They are the cheapest.

One Griffin Blade will outwear four of the best Paris or any six of the American Blades.



The Griffin Blades are for Sale at most Hardware Stores.

Meers, PENNY MASON & CO.—GENTS: I do a great deal of fret sawing, and have used many kinds of blades, but I find the Griffin Blades the best. I find that they cut more than twice as fast as the best Paris blades, and will last about four times as long. Yours truly, HENRY J. SCHANCK.

We have hundreds of letters from those using the Griffin Blades, which speak of them in the highest terms.

We are the sole agents for these blades in New York. If you do not find them at the hardware stores, we will send them to you at the following prices, postage paid:

Sizes from No. 1 to 6 inclusive, 15 cents per dozen, or \$1.25 per gross.
No. 7 to 10 inclusive, 20 cents per dozen, or \$1.50 per gross, with the usual discount to dealers. If fifty gross are ordered at one time we will furnish with them a nice case with partitions for each of the ten sizes.

We have a full stock of Lester, Rogers and Cricket Saws, Wood, Designs and all things else in the bracket sawing line.

MILLERS FALLS CO., 74 Chambers St., New York.

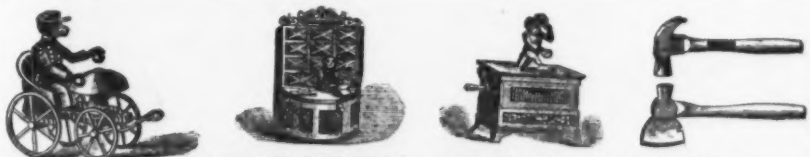
HEATON & DENCKLA HARDWARE CO., Hardware Commission Merchants,

507 Commerce Street, Philadelphia.

M. & G. BROOKE'S "Anchor Brand" Nails, Brads, Spikes, &c.
MALLORY, WHEELER & CO.'S Door and Pad Locks.
UNION MANUFACTURING CO.'S Butts.
AMERICAN SCREW CO.'S Screws.
D. R. BARTON TOOL CO.'S Edge Tools, &c.
FRANCE'S Shutter Holders.
Anti-Window Rattlers, Brasses and Nickel-Plated.
WESTERN FILE CO.'S Cast-Steel Files.
AMERICAN SHEAR CO.'S Shears and Scissors.
HP NAIL COMPANY'S Wire, Steel, Iron and Brass Nails and Barbed Nails.
STEELE & SONS' Wrought Handle Sad Irons.

EXCELSIOR MILLS, Genuine Turkish Emery.
BROWN & BRO.'S Silver Plated Spoons and Forks.
GAYLORD MANUFACTURING CO.'S Tins, Chest and Cupboard Locks.
AMES' Genuine A Chester Emery.
COLWELL & COLLINS, NORWAY BOLT CO., Norway Carriage and Tire Bolts.
PLYMOUTH MILL CO.'S Black and Tinned Iron Rivets.
AMERICAN MACHINE CO.'S Fluters, &c.
STUART PETERSON & CO.'S Tinned and Enamelled Ware, &c.

Also a large line of Heavy and Shelf Hardware.



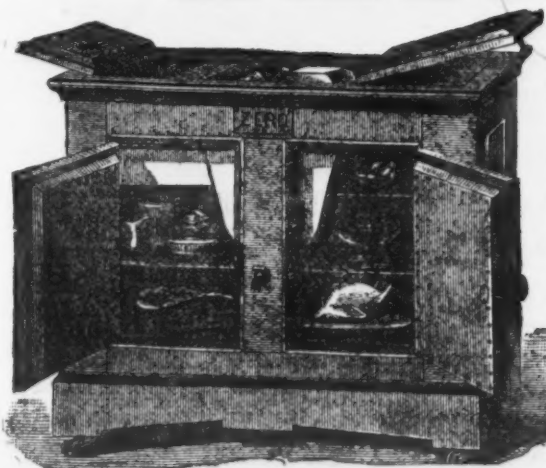
VARIETY IRON WORKS.

KYSER & REX,

Manufacturers of
Hardware Specialties, Iron Toys, Novelties
and Housefurnishing Hardware,
Main Office and Factory, Trenton Ave. and Margaret St., Frankford, Philadelphia.
Branch Office, 19 & 21 S. 4th St., Phila. Hardware specialties manufactured to order.

ZERO

Refrigerator,



with Water, Wine, Milk and Butter Cooler. The best Meat, Fruit, Fish and Ice Preserver in the world; 35.00 in use. Grand award of merit by the Centennial Exhibition; also by the New England Agricultural Society, 1870, 1878; American Institute, 1877, '79, '75, '76, '78 and 1883. No drip; no water on the floor.

Report of the Centennial Exhibition on the Zero Refrigerator.
"1st. Beauty of design and excellent workmanship. 2d. The absence of all communication between the ice and provision chamber. 3d. The absence of moisture on the inside lining. 4th. The impossibility of the contact of hot air with the ice. 5th. The condensation of the moisture contained in the provision chamber, on the cold surface of the ice box, which, running off into a trough, is passed out at the bottom. 6th. The economy of ice and uniformity of temperature. 7th. The filling of the refrigerator with cork, which is a good non-conductor, cleanly and odorless."

Send for Catalogue.
ALEX. M. LESLEY, Manufacturer, 380 Sixth Ave., New York.
Also Manufacturer of the POLARIS COOLER, GOTHIC and ROTUNDA FURNACE.

THE LEADING WRINGER OF AMERICA.

SIMPSON & GAULT (PEERLESS WRINGER CO.),

New York Office, 79 Chambers St. European Offices, Place Vendôme, Paris. 7 Poultry, London.
Office and Factory, CINCINNATI, OHIO.

THE

PEERLESS

CLOTHES WRINGERS.

Sold by the Jobbing Trade everywhere. Most Saleable Wringer in the market.

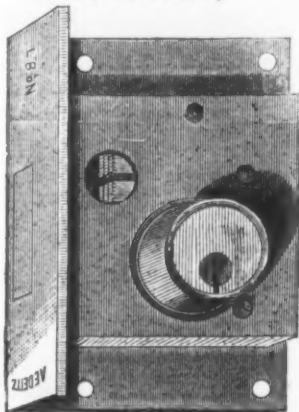
MR. L. F. BLUE, who has been in our employ for a great many years, is our SOLE AGENT, and will visit the jobbing trade throughout the United States.

A. E. DIETZ,

(Successor to Barnes & Dietz.)

Manufacturer of

Store Door Locks, Night Latches, Padlocks, Drawer Locks, &c., with Flat Steel Keys.



Durrie & McCarty, Agents,
97 Chambers & 81 Reade Sts., New York.

PRIZE MEDALLISTS:

Exhibitions of 1864, 1866, 1867, 1872, 1873, and only award and medal for Noiseless Steel Shutters at Philadelphia, 1876; Paris, 1878, and Melbourne, 1882.

CLARK, BUNNETT & CO., LIMITED,

Late CLARK & COMPANY,

Original Inventors and Sole Patentees of

Noiseless Self-Coiling Revolving

STEEL SHUTTERS,

FIRE AND BURGLAR PROOF. ALSO IMPROVED

ROLLING WOOD SHUTTERS,

Of various kinds. And Patent

METALLIC VENETIAN BLINDS.

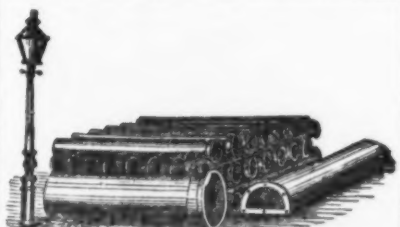
Endorsed by the

Leading Architects of the World.

Send for Catalogue.

Office and Manufactory,

162 & 164 West 27th St., N. Y.



R. D. WOOD & CO.,
Philadelphia,

Manufacturers of

Cast Iron Pipe

FOR WATER AND GAS,

Lamp Posts, Valves, &c.,

Mathew's Pat. Anti-Freezing Hydrants.

400 CHESTNUT STREET.

STAR LOCK WORKS.

ESTABLISHED 1836.

Trunk Locks, Door Springs,

Pad Locks, Trunk Stays,

Dead Latches, Keys, &c., &c.

110 South 5th St., and Sansom, bet. 8th

and 9th, PHILADELPHIA.

PATENTED

Scand. Pad Locks

With Flat Keys.

Shackle secured to the Lock Box.

HILLEBRAND & WOLF.

THE PERFECT

DOOR SPRING.

[Patent Applied for.]

ENLARGED.

Costs less, and surpasses in Simplicity

Durability and Perfection all other

contrivances for Closing Doors.

Send for explanatory Circular and Price List.

The Perfect Door Spring Mfg. Co.,

Sole Manufacturers,

328 Seventh Ave., New York.

No 35

$\frac{3}{8} \times 1\frac{1}{2}$

BROWNING, SISUM & CO., 85 Chambers St.,

Manufacture

Belt Hooks, Cotter, Spring Keys, D Ring

Staples, and everything pertaining to wire bending.

Factory, BROOKLYN.

L. COES'

Genuine and Mechanics

PATENT

Screw Wrenches

MANUFACTURED BY

L. COES & CO.,

Worcester, Mass.

ESTABLISHED IN 1839.



Our Genuine Wrenches are made with straight bars, full width and enlarged jaw, having ribs cast inside, which strengthen the jaw and give a full bearing on front of bar. These improvements, in combination with our new ferrule, made with double bearings, an iron tube, fitted to the shank and resting against the lower bearings, rigidly held in position by the handle and nut, effectually preventing back thrust of ferrule (see sectional view), verify our claim that we manufacture the heaviest and strongest Wrench in the market. None genuine unless stamped

L. COES & CO.,

Worcester, Mass.

Warehouse,

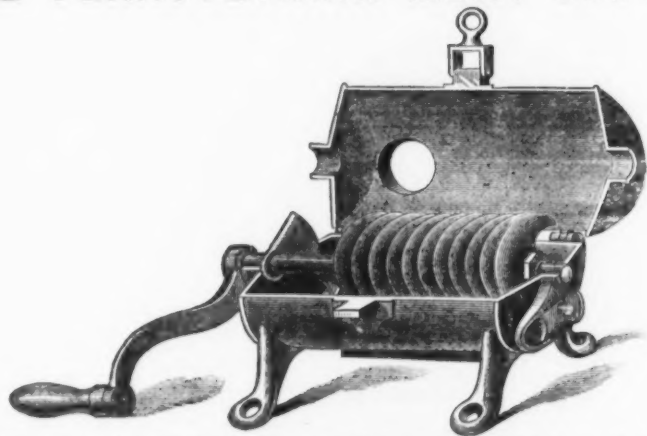
97 Chambers and 81 Reade Sts.,

NEW YORK.

DURRIE & McCARTY,

Sole Agents.

THE PENNSYLVANIA MEAT CUTTER.



Has the capacity of Cutters upon the market which cost 20 per cent. more money.

PRICE LIST.

No. 1, containing 8 Steel Knives... per dozen, \$24.00
No. 2, containing 12 Steel Knives... " " 36.00
No. 3, containing 16 Steel Knives... " " 48.00
Nos. 1 and 2 are packed 1/2 dozen in a box; No. 3 packed 1/4 dozen in a box.
Discount to the trade 50 per cent. Orders solicited.

LLOYD, SUPPLEE & WALTON, Philadelphia.
DURRIE & McCARTY, New York City.

CHAMPLAIN Forged Horse Nails.

MANUFACTURED BY THE

NATIONAL HORSE NAIL CO.,

Vergennes, Vermont.

HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST

NORWAY IRON AND WARRANTED.

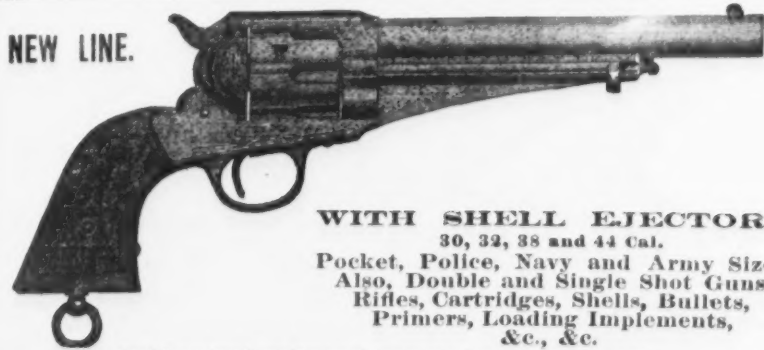
A full line of "CHAMPLAIN" and "NATIONAL"

Nails always on hand at our Warehouse,

97 CHAMBERS AND 81 READE STREETS, NEW YORK.

DURRIE & McCARTY Sole Agents.

NEW LINE.



WITH SHELL EJECTOR

30, 32, 38 and 44 Cal.

Pocket, Police, Navy and Army Sizes.

Also, Double and Single Shot Guns.

Rifles, Cartridges, Shells, Bullets,

Primers, Loading Implements,

&c., &c.

Send for reduced catalogue and discounts of goods manufactured by

E. REMINGTON & SONS,
283 Broadway, NEW YORK.

MOORE'S HOIST

For Description Write

PENFIELD BLOCK CO.,

LOCKPORT, N. Y.

N. B.—One man can raise 600 lbs. with ease, and lower same at any desired speed, and by use of brake suspend load at pleasure. Adapted to the wants of merchants, manufacturers, railroads, farmers.

HENRY B. NEWHALL,
105 Chambers Street,
NEW YORK AGENT.

S. H. & E. Y. MOORE,
163 & 165 Lake Street,
CHICAGO AGENTS.

Imports for the Third Quarter.

The following table gives a comparison of the importations of some leading articles for the third quarter of the current and two preceding years:

	1879.	1880.	1881.
Books.....	\$35,719	\$42,129	\$50,080
Buttons.....	724,062	923,800	1,004,766
Cheese.....	93,322	126,372	166,166
China ware.....	320,985	446,289	506,336
Cigars.....	276,269	340,149	459,871
Coal.....	8,310	8,123	49,932
Coffee.....	9,629,002	10,795,153	8,047,642
Cotton.....	79,314	103,437	123,312
Earthenware.....	420,990	644,426	591,835
Furs.....	831,274	1,076,795	1,494,319
Glass plate.....	123,050	245,123	280,107
India rubber.....	1,079,512	1,402,214	1,360,571
Indigo.....	237,723	183,883	136,686
Leather and dressed skins.....	1,162,609	2,283,112	1,617,847
Undressed skins.....	3,106,686	4,932,177	5,189,777
Liquors.....			
Brandy.....	181,831	182,600	266,454
Gin.....	28,048	25,987	40,953
Metals.....			
Copper and ore.....	23,388	52,756	71,500
Iron, bars.....	699,198	2,289,245	748,832
Iron, pig.....	153,795	1,772,870	1,716,866
Iron, R. & B. bars.....	275,868	1,925,422	1,710,096
Iron, sheet.....	113,554	111,742	137,707
Lead.....	20,368	15,057	54,985
Spelter.....	11,024	38,440	30,951
Steel.....	185,606	666,606	1,304,895
Tin, sheet.....	420,994	705,390	935,893
Tin, plates.....	1,888,031	1,116,234	1,039,021
Zinc.....	24,888	7,567	15,016
Molasses.....	486,409	484,082	237,258
Oils.....			
Lard.....	733	733	733
Olive.....	76,123	54,813	101,138
Palm.....	175	7	366
Paper stock.....	716,406	7,073,567	835,039
Salt.....	102,000	107,839	159,839
Sugar.....	9,555,145	13,351,971	13,199,409
Tea.....	3,076,900	3,360,870	4,324,589
Tobacco.....	395,794	823,679	999,775
Watches.....	257,583	467,221	575,147
Wines-Unspec.....	233,653	572,591	681,951
Wool and waste.....	790,145	709,788	841,810

Jones & Laughlins' Chicago Warehouse.—The Chicago Times says: Mention was made something like a year ago of the completion in Chicago of the western trade quarters and general iron warehouse of Messrs. Jones & Laughlins, its completion being at that time contemplated by the trade of the country as making Chicago the site of the model iron warehouse of the United States. The former and old-time quarters of Messrs. Jones & Laughlins, on Canal and Jackson streets, had, from an early day, constituted the base and center of the general Northwestern traffic in heavy iron and steel merchandise, with an important bearing on the commerce of the nation in the great items of bar and sheet iron, patent cold-rolled shafting, light "T" rail, machine bolts, screws, rivets, nails, anvils, steel goods, &c., the new building, with something like 125,000 feet of floorage, giving them triple their former room for accommodation of stock. A recent visit to the great establishment reveals the fact that their immense enlargement was a very seasonable step, the enormous expansion of the iron trade of Chicago having reached a point to tax even their increased resources and to necessitate even a further increase of special facilities; their private track arrangements, which connect them with the entire railway system of the country and enable them to make direct consignments to every trade point in the Northwest, are now ample to accommodate nine cars under roof at once, with an easy handling of 21 carloads a day. Jones & Laughlins are sole manufacturers of the patent cold-rolled shafting used in most of the great manufacturing and industrial works of the country, and are the general Western center of the traffic in railway supplies. Probably all other influences combined, in the direction of private enterprise, have not contributed more toward making Chicago the distributing center of the iron interest for the Western half of our continent than the accommodation afforded it by this house.

The permanent exhibition building at Philadelphia is being fast emptied of its contents, prior to its demolition. The printed catalogue contains over 600 items of the articles that will be sold at auction in the building on the 12th and 13th inst., comprising the pavilions in which the German, Mexican, Russian, Chinese, Japanese, Spanish, Turkish, Argentine, Belgian, Egyptian, Norwegian and Brazilian goods were exhibited, and all the shafting in the western end of the building; also, the office and other fixtures.

The Newfoundland Railway Company, in which New York capitalists and engineers are largely concerned, has formally commenced constructing operations. The termini of this new line, which will be 400

miles long, are to be St. John's on the south shore and Notre Dame on the north. As we have heretofore stated, a primary object is to open the rich mining regions on the line of the road.

THE DETROIT LUBRICATOR MFG. CO.'S CONTINUOUS FEED Lubricator Cups

For oiling valves and cylinders of steam engines by the only perfect method.

Through the Steam Pipe
The oil passes in sight, drop by drop, into the column of steam where it vaporizes, thus becoming a steam lubricant, oiling perfectly every part reached by the steam. Any clean oil, black or white, light or heavy, may be used. Saves from 50 to 90 per cent. in oil and wear of machinery, thus paying for itself several times a year. A cup will be sent to responsible parties on twenty days' trial, if desired. In ordering the oil passing drop by drop through a transparent water chamber, were devised by us, and the same are fully embraced by many Letters Patent owned and controlled by us. Lubricators of every nature embodying the above feature, made by other parties, are encroachments upon our rights, and we will hold purchasers and users, as well as manufacturers, responsible in damages for such violations.

DETROIT LUBRICATOR MFG. CO.,
Office, 98 Griswold St., Detroit, Mich.
First Prize at Fair American Institute and Millers' International Exposition, Cincinnati, 1880.
NOTE.—In our recent suit against the American Lubricator Co., of Detroit, before Justice Stanley Matthews, of the U. S. Supreme Court, involving their right-feed feature, a decree was rendered in our favor August 20, 1881.

THE PATENT SCREW WINDOW BALANCE

An adjustable mechanism which automatically does the holding work of each weight, at one quarter the expense of their application. No bearings, cords, pulleys, weights or attaching to the sash. They are put into the sash channel of the frame and work on the side edges of the sashes, allowing the ready removal of the latter for cleaning. All rattling of the sashes is prevented. The Screw Balance is now made for all sashes under 20 lbs. in weight, which they retain at any point opened, the slightest pressure of the hand closing them, as when weights are used. The sashes are locked with the meeting rail lock as with weights. Easily applied, cheap, durable, efficient, and alone in its special work. The only mechanical substitute for sash weights. Have been in use nearly four years with satisfaction to the user; proved by constantly increasing orders. Sample set, for one window, four balances, mailed free to any address for \$1.00. If not kept by your hardware dealer send a line yourself to

ROBT. B. HUGUNIN,
SOLE MAKER,
Hartford, Conn., U. S. A.

CHAMPION WEATHER STRIPS.
The Best in the Market.
For Sale by all Hardware Dealers.

Also manufacturers of Wood Carpet, Show Case, and Cabinet Mouldings, &c.
DENNIS & CO.,
167 Madison St., CHICAGO, ILL.
Factory, 317 and 319 W. Lake St.

LEIGH'S DISCOUNT BOOK
Acknowledged by all the best work of the kind ever published. Price, by mail, One Dollar.
SPECIAL NOTICE.—This book will be cheerfully sent for examination or comparison to any responsible house requesting it, and return postage paid if book is not satisfactory.
E. B. LEIGH,
Address, St. Louis Elevator, St. Louis, Mo.

THE SAFETY ICE CREEPER.
Combines every advantage possible in an ice creeper. Attaches with a thumb screw; turns over into instep; one size for all.
R. P. SCOTT & CO.,
Manufacts, NEWARK, N. J.

W. CLARK'S PAT. HORSE CLIPPERS.

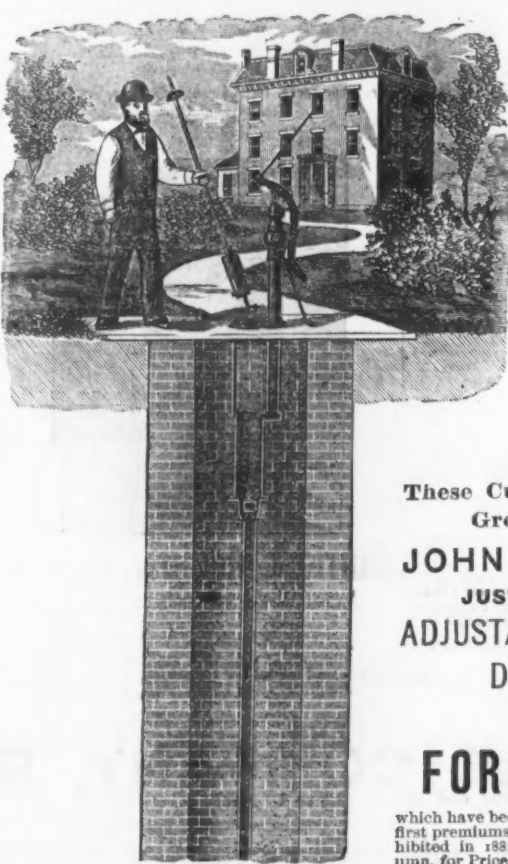
No. 1.—This well known instrument has now been before the public for many years, and has given universal satisfaction, and is everywhere acknowledged to be by far the best and therefore the cheapest in the market. It has been known to clip between 200 and 300 horses before requiring sharpening.

W. Clark's Patent Clipper No. 2 for Heads.

To be obtained of all Saddlers and Ironmongers. Wholesale of the Patentee,
W. CLARK,
528, late 232 Oxford St., London, W.
And C. M. MOSEMAN & BRO.,
128 Chambers St. New York.

ROEBUCK'S PATENT Wood and Rubber Weather Strips.

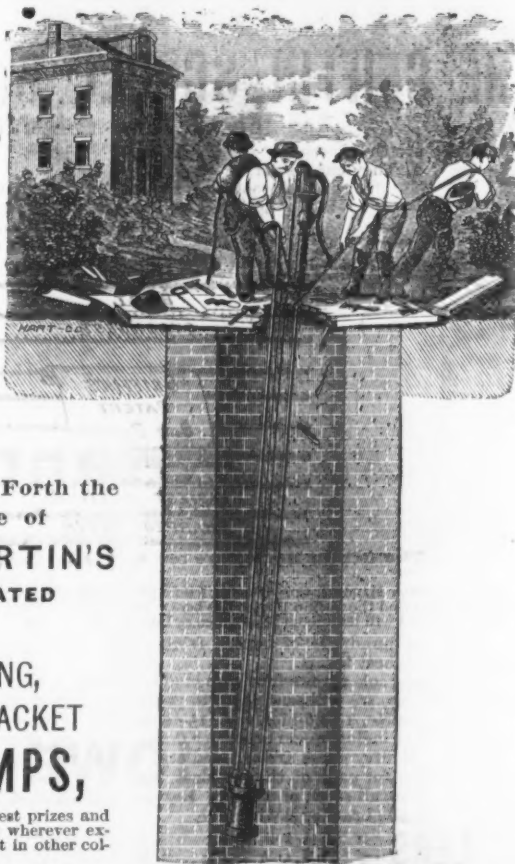
Walnut, Oak, Cherry, Mahogany and White Enamelled. Illustrated price lists furnished on application.
Manufactured by
S. ROEBUCK & CO., 164 Fulton St., N.Y.



Take
Your
Choice.
—
This is a
true and real
picture of
THE OLD WAY
and
THE NEW.

These Cuts Truly Set Forth the
Great Advantage of
JOHN P. MARTIN'S
JUSTLY CELEBRATED
ADJUSTABLE,
DOUBLE ACTING,
RED JACKET
FORCE PUMPS,

which have been awarded the highest prizes and first premiums over all competitors wherever exhibited in 1881. See advertisement in other column, for Price Lists and Circulars.



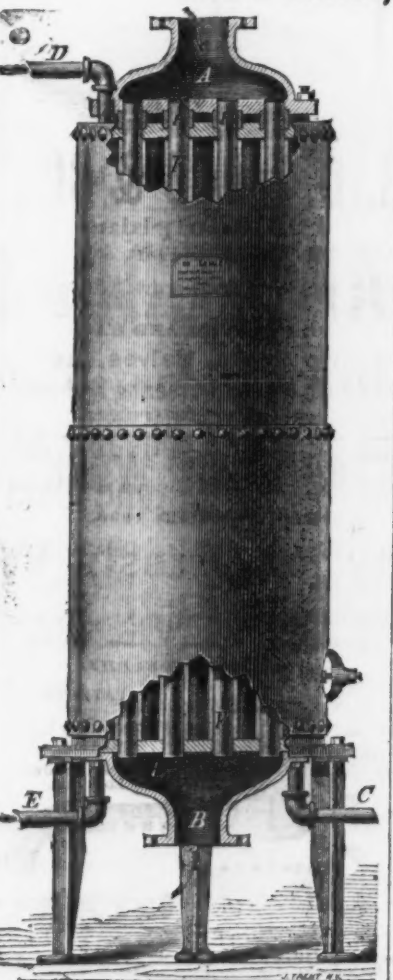
This is the way Our
Grandfathers had to do it
Oh! how Hard, Laborious,
Expensive and unsatisfactory.

This is the way Young
America Does It. For it is
Simple, Durable, Cheap and
Satisfactory.

ADDRESS

JOHN P. MARTIN, Cincinnati, Ohio, U. S. A.

THE LOWE PATENT Feed Water Heater and Purifier,



FOR
Heating and Purifying Water
for Steam Boilers.

Patented July 12, 1877.
HAS STRAIGHT TUBES.
Simplicity, Reliability and Efficiency, at Less
Cost than any Other

Write for prices and further information to the
manufacturers,
LOWE & WATSON
BRIDGEPORT, CONN.

STEEL:

Its History, Manufacture, Properties, and Uses.

By J. S. JEANS,
Secretary of the Iron and Steel Institute.
Section I. History of Steel: Chap. 1. History of Steel; 2. Early History in England; 3. Progress of Invention; 4. History of Bessemer Process; 5. Siemens-Martin Process; 6. Other Steel-making Processes; 7. Steel in America; 8. Germany; 9. France; 10. Austria; 11. Russia; 12. Sweden; 13. Other Countries. Section II. Manufacture of Steel: Chap. 14. Cementation and other Methods; 15. Manufacture by Bessemer Process; 16. Siemens-Martin Process; 17. Other Methods. Section III. Chemical and Physical Properties of Steel: Chap. 18. Phosphorus in Steel; 19. The Use of Manganese; 20. Spiegeleisen; 21. Sulphur in Steel; 22. Silicon in Steel; 23. Tensile Strength of Steel; 24. Mechanical Tests of Steel; 25. Analysis of Steel. Section IV. Uses of Steel: Chap. 26. Application of Steel to Railway Purposes; 27. To Shipbuilding; 28. To Bridge Building; 29. To General Purposes; 30. Guns and Armor Plates; 31. Other Purposes.
Price, \$1.50

FOR SALE BY
DAVID WILLIAMS,
62 Reade Street, - - New York.

CLARK'S



IMPROVED SCREW DRIVER, And Case containing Handle and Set of SCREW DRIVERS.

The Blades are made of JESSOP'S CAST STEEL, with milled Points and Shanks, making them interchangeable, and are warranted.

This Driver has four Blades from 1/4 Inch to 1 Inch in width.

ALSO MANUFACTURER OF WILLIAM A. CLARK'S
Expansive Bit,
with two Cutters, boring from 7-8 to 3 inches.

R. H. BROWN & CO.,

SUCCESSORS TO
WM. A. and F. E. CLARK,
WESTVILLE, Conn.

MORSE TWIST DRILL AND MACHINE CO.

NEW BEDFORD, MASS., Sole Manufacturers of
Morse Patent Straight-Lip Increase Twist Drill,
Beach's Patent Self-Centering Chuck, Solid and Shell Reamers,
BIT STOCK DRILLS,

DRILLS FOR COES, WORCESTER, HUNTER AND OTHER HAND DRILL PRESSES. BEACH'S PATENT SELF-CENTERING CHUCKS, CENTER AND ADJUSTABLE DRILL CHUCKS, SOLID AND SHELL REAMERS. DRILL GRINDING MACHINES. TAPER REAMERS, MILLING CUTTERS AND SPECIAL TOOLS TO ORDER.

All Tools exact to Whitworth Standard Gauges.

GEO. R. STETSON, Supt. EDWARD S. TABER, Treas.

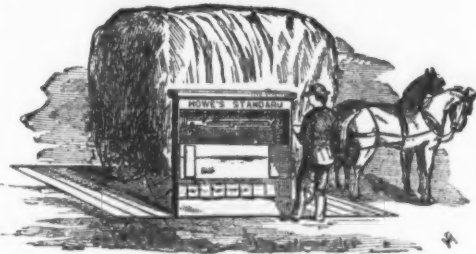


THE IMPROVED HOWE SCALE

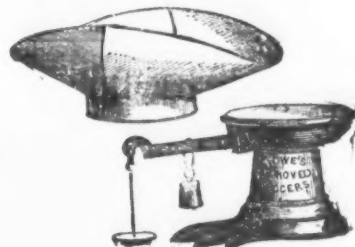
THE ONLY SCALE HAVING PROTECTED BEARINGS.



ADAPTED
TO THE
Standards
OF ALL
COUNTRIES.



ADOPTED
AND USED BY THE
U. S. CUSTOMS
DEPARTMENT.



MANUFACTURED BY THE

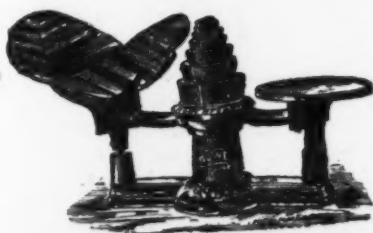
HOWE SCALE COMPANY, Rutland, Vt.

Established 1856.

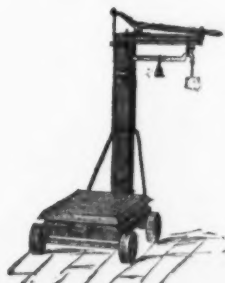


PAGE, FARGO & CO.,

325 BROADWAY, NEW YORK, DEPOT FOR THE SUPPLY OF THE EXPORT TRADE.



CATALOGUES
AND
PRICE LISTS
In any Language,



SENT FREE
TO ANY
ADDRESS
Upon Application.



THE HARTFORD COMPRESSED-AIR PUMP.

Water Driven to any Hight and Distance by Compressed Air.

Country Houses Supplied Cheaply and Certainly for Bath Rooms, Water Closets, Hot and Cold Water Faucets, &c.

Plenty of Fresh Water for Stock on Farms.

The Best Pump for Irrigating, Supplying Railroad Tanks and for Mining Purposes.

This pump is being introduced into all the foreign countries, and is accepted by all mechanical men as the very best Pump in the market. It is more durable and needs less repairs than any other apparatus for like purposes, and is therefore the cheapest in the end, if not at first. Its advantages over other Windmills, Rams, and other contrivances for raising water, are quickly seen. For Circular and Price List address

THE HARTFORD COMPRESSED-AIR PUMP CO.,

EZRA BROOKS, Sec. and Gen'l Manager,

HARTFORD, CONN.. U. S. A.

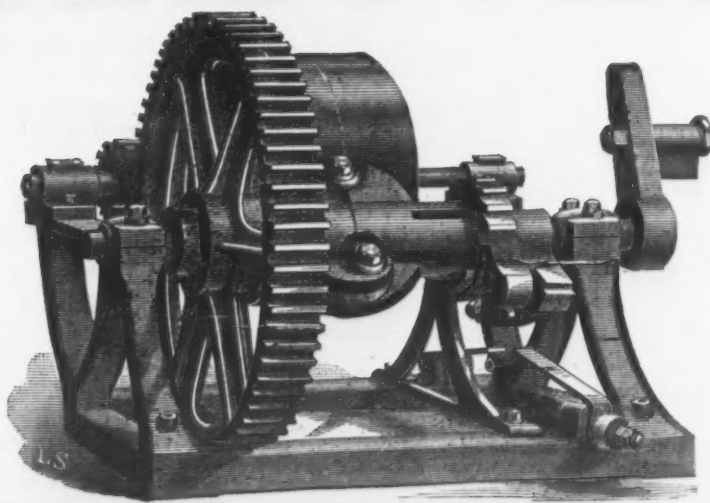
REMOVAL.

NEW HAVEN, CONN., July 15, 1881.

DEAR SIR: We have removed our works to our new factory, corner Lloyd and River Streets, Grapevine Point, where we have increased facilities, not only for the production of the

Peck Patent Drop Press,

but also for the manufacture of Drop Dies, Drop and Machine Forgings and Special Machinery.



Our Forging Department is fitted out with the latest improved tools.

We are prepared to quote prices for the manufacture, by contract, of specialties in the Drop Forging line. We have also facilities for furnishing heavy Machine Forgings, such as Cranks, Connection Rods, Drop Die Blocks, Heavy Dies, &c.

Thanking you for past favors, and hoping to receive a continuance of same, we remain, yours respectfully,
BEECHER & PECK.

Covert "O. K." Horse Tie



This Tie is made up with the new patent Covert Adjuster, which is superior to any article in use for the same purpose, and is much cheaper.

COVERT MANUFACTURING COMPANY,

WATERVLIET ARSENAL, WEST TROY, N. Y., Nov. 9, 1880.
The "Covert Snap" has been used in large quantities in the military service by our troops in the West, and has given great satisfaction, as far as known, to the Ordnance Department.
F. V. HAGNER,
Brevet Brig.-General U. S. A., Col. of Ordnance.

SOLE MANUFACTURERS OF



COVERT'S
PATENT HARNESS SNAPS,

Covert "O. K." Cattle Tie



This is the same as the Horse Tie, less the snap and the side ring on the adjuster for its attachment, and also the usual difference in the length of the rope.

COVERT DRIVING REINS.



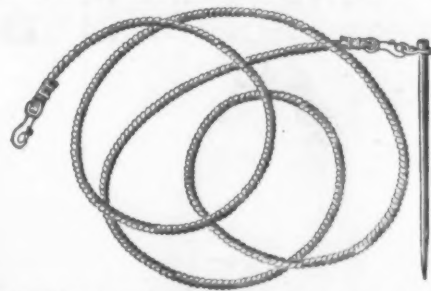
Made with the Covert Snaps and Adjuster. Laps and ends clamped with steel rings. The cross lines easily adjusted and firmly held at any length desired. Made of best 5-16 in. Cotton and Jute Cord.

COVERT HITCHING CORD.



This cord is made of 5-16 in. solid braided cord with Covert Snap at each end, and the Covert Adjuster, as appears in the cut. It is used by snapping one end in the bit and the other end in the adjuster, thus obviating the trouble of tying.

Covert Lariat Tether & Picket Pin.



This Tether is made of 1/2-in. rope, 30 ft. in length, with the Covert Swivel Snap at each end, clamped on with the steel ring clamp. The pin is 15 in. in length, with a movable swivel attachment at the head, which, in connection with the swivel snaps, renders impossible any twisting, kinking or tangling of the rope.

CHAIN AND

ROPE HALTERS, HORSE AND

ROPE GOODS

CATTLE TIES, HALTER LEADS, &c.

These goods are sold by all leading jobbers in General and Saddlery Hardware, and the same discounts given from the list to the trade as when purchased direct from the factory.

All Manufactured by Machinery, and are the Best and Cheapest in the World.

SEND FOR ILLUSTRATED CATALOGUE AND PRICE LIST.

COVERT MANUFACTURING CO.,

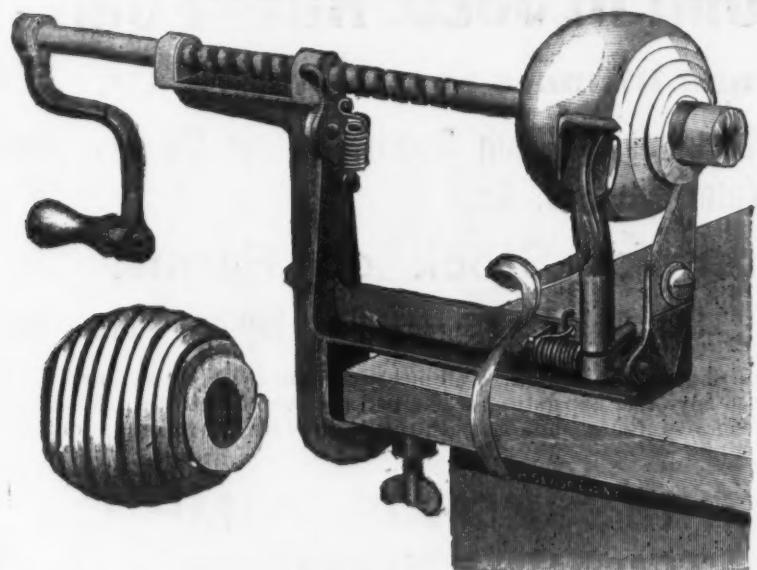
West Troy, N. Y.

COVERT CATTLE TIE.



This is the same as the Horse Tie, less one Snap and Thimble, and has eight and one-half feet of rope instead of ten.

THE WHITE MOUNTAIN PARER, CORER AND SLICER.



This Parer, introduced last year, has completely revolutionized the Parer business of the world, and as our patents are broad and reliable, has practically given it to us. As in the past, we shall promptly prosecute all persons infringing upon our claims. We are also sole manufacturers of the Bay State Parer, and all others made under Bay State Patents, and are fully prepared to furnish Parers for large canning and evaporating establishments. Also manufacturers of Turn Table and Lightning Apple Parers, White Mountain Potato Parers, &c.

GOODELL CO.'S BUTCHER KNIVES.



We now make five distinct styles of Butcher Knives, at corresponding prices. Every blade of every style is warranted in cutting quality equal to the best on earth, and everybody who has seen them knows that the handles are superior, both in style and strength, to all others.

Also, superior hot-water proof Table Cutlery and Shoe Knives.

GOODELL COMPANY, Antrim, N. H., U. S. A.

PROVIDENCE STEAM TRAP COMPANY, Manufacturers of Newton's Patent Steam Trap, Compensating Valve, Oscillating Furnace Bars, and Furnace Economisers.

R. NEWTON, C. E. M. E., Supt.

JOHN TURNER, Treas.

JOHN SHORE, Sec'y.

To Manufacturers, Bleachers, Dyers, and all Users of Steam: We wish to call your special attention to our PATENT STEAM TRAP, acknowledged by practical engineers and manufacturers to be the best, simplest, most effective and durable Trap ever brought before the public. The simplicity of this Trap consists of doing away with all expansions and contractions, no glands or stuffing boxes, or bolts of any description required: no compound cylinders and no copper rods. The cover can be removed at any time to see it work; and if required the discharged water can be elevated from two to thirty feet, so that it can be used for other purposes. They will last from thirty to forty years. As regards frost and snow it makes no difference, as we have had and still have one working in the open air at Washington Mills, Lawrence, Mass., and it has done its work well, never having had any trouble with it, and bids defiance to all weather. That they have been thoroughly tested can be seen by the testimonials given below, of the few that have come to hand:

TESTIMONIALS.

Washington Mills, Lawrence, Mass., November 18, 1880.
Mr. R. Newton.—DEAR SIR: The Steam Trap we bought of you last August works admirably. Please send us another as soon as possible. Yours truly,
JAMES B. EINER, Mech. Supt.

Clyde Bleachery and Print Works, River Point, R. I., January 17, 1881.
Mr. R. Newton.—DEAR SIR: The Steam Trap we had of you is in successful and very satisfactory operation. Its simplicity in construction and undoubted durability will commend it to all who are in want of a superior Steam Trap. We shall order more when in need of any. Yours truly,
S. H. GREEN & SONS.

A. & W. Sprague Mfg. Co., Cranston Print Works, R. I., Jan. 15, 1880.
Mr. Robert Newton.—DEAR SIR: The Steam Traps we bought of you work first-class and give every satisfaction, and appear to be very durable. We think them the best Steam Trap that we have ever had. When in want of more will write you. I remain, yours, truly,
THOMAS BRISTOW, Supt. Cranston Print Works.

Office of Washington Mills, Boston, December 24, 1880.
Providence Steam Trap Co.—GENTLEMEN: Please forward to Washington Mills as soon as possible six (6) 1/2 inch Traps and send bill to me.
Yours truly,
HENRY F. COE, Treas.

Kendall Manufacturing Co., Providence, R. I., Feb. 1, 1881.
Providence Steam Trap Co.—GENTS: We have used one of your Steam Traps for some time and would say that we find it gives perfect satisfaction.
Yours truly,
NICHOLAS SHELDON, Treas.

Providence, R. I., December 18, 1880.
Mr. Newton.—DEAR SIR: We have your Steam Trap working satisfactorily, and can conscientiously recommend it to all. Yours, very truly,
B. COLLINGHAM, Supt. Atlantic Mills.

ROBERT NEWTON, C. E. M. E., Inventor and Patentee, Providence, R. I.

PATENT OSCILLATING FIRE BARS.

We wish also to call your attention to R. Newton's PATENT OSCILLATING FIRE BARS, which for durability, economy and application are acknowledged by all practical engineers that have seen them up to the present time to be the best ever brought before the public. This invention the patentee has labored at more or less since 1851. These bars have long been wanted, and their use will at once prove their efficacy as an economiser of fuel and labor. These bars can consume from four to twenty-six pounds of coal per square foot of grate, per hour, and not warp; and the apertures can be kept clean so that they can get a regular supply of oxygen, which is the life-giving power of calorific. They can be applied to all kinds of boiler surfaces (except vertical), and can be fitted to the furnaces in about five hours. Testimonials can be forwarded, if required, to show that they are now in use in some of the largest firms in the world.

SOME OF THE ADVANTAGES: These bars allow the use of inferior coal; evaporating power is greatly increased. This is a great boon where boiler power and space is limited. This advantage cannot be over-estimated in the case of marine boilers. The oscillating of the fire bars both cuts and lifts the slug, and clears the apertures at the same time. The bars give four motions in one oscillation, and cannot get out of order. They are also free of expansion and contraction, both longitudinal and transversal, and however careless the stoker may be he cannot leave them so as to take any harm. They are so cast, and of such metal, that they are the most durable bar ever brought into use. All now in use are very much approved. They are very simple and cannot get out of order. Their cost is so reasonable that they come within the reach of all. The company are now granting licenses to several firms to make and apply them, and are open to arrange with other parties. N. B.—The company furnish first sets of models.

Agents wanted for different locations.

All communications should be addressed to PROVIDENCE STEAM TRAP CO., P. O. Box 1213, Providence, R. I.

THE OHIO GRINDSTONE CO.

MANUFACTURERS OF GRINDSTONES

SUITABLE FOR ALL PURPOSES AND IN ANY QUANTITY.

Cleveland, Ohio.

PATENTED ARTICLES OF MALLEABLE IRON.

Hammer's Malleable Iron Hand Lamps.



Screw, Kerosene Size.

Hammer's Adjustable Clamps.

Hammer's Malleable Iron Oilers, 3 Sizes.

Hammer's M. I. Hanging Lamps.

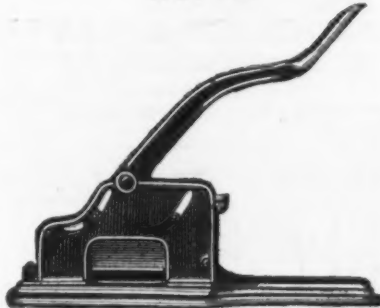
NEW pattern Heavy Screw Clamps; strongest in the market.
For sale by all the principal Hardware Dealers.
Send for Price List.

MALLEABLE IRON CASTINGS

Of superior quality, and Hardware Specialties in Malleable Iron made to order.

HAMMER & CO.,
Branford, Conn.

Acme Tobacco Cutter NO. 10.



Manufactured by

F. F. Adams & Co., Limited
ERIE, PA.

BUFFALO SCALE CO.,

BUFFALO, N. Y.

Manufacturers of

R. R. Track Scales, Hay Scales, Coal Scales, Grain Scales, Platform Scales, Counter Scales, &c.
Send for price list, stating what you want.

TINIUS OLSEN & CO.,

STANDARD SCALES

AND

TESTING MACHINES.

Manufacturers of Olsen's Little Giant Testing Machine, and Improved Railroad, Wagon and Furnace Charging Scales.

Office and Works, N. W. cor. 12th and Buttonwood Sts., Philadelphia.



R. Onderdonk,
Sole Manufacturer of
LEVER LEMON SQUEEZER,
With Perforated Strainer.
405 Grand St.,
NEW YORK.



THE "EDDY" STRAIGHTWAY VALVES.

ALSO,

FIRE HYDRANTS, Axe, Hatchet, Powder and Brush Machinery.

MOHAWK & HUDSON MFG. CO.,
WATERFORD, N. Y.

BENTON, FAULKNER & BIRD, N. Y. Agents. C. H. & W. H. MIDDLETON, Phila. Agents.



The Patent Combined Dinner Pail and Lantern.

The most perfect Dinner Pail in the world. Hot coffee for dinner and a Lantern at night.
Manufactured by J. S. HIGHT,
PORT CHESTER, N. Y.

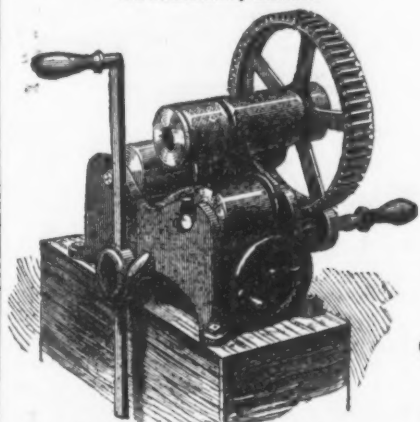
Sent by express on receipt of \$1.00. Agents wanted.



THE BEST NUT TAPPING MACHINE
LATEST IMPROVEMENTS
J. S. HIGHT, PORT CHESTER, N. Y.

WILEY & RUSSELL MFG. CO.,

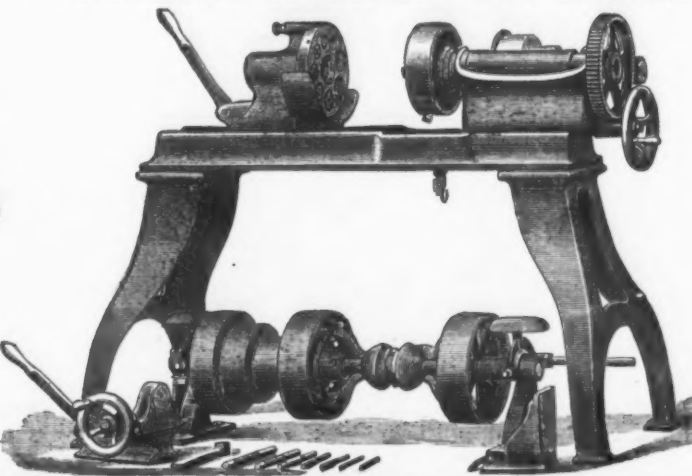
Greenfield, Mass.



Send for Illustrated Price List.

Agents in London, Eng., Messrs. SELIG, SONNENTHAL & CO.

LIGHTNING SCREW-CUTTING MACHINERY and GREEN RIVER TOOLS.



BEARDSLEY SCYTHE COMPANY, West Winsted, Conn.

Manufacturers of the well-known brands of,

German Steel, Cast Steel and Silver
Steel Grass Scythes.

ALSO THE

Clipper, Emperor, Beardsley's Golden Trimmer,
Conqueror, Dutchman, Waldron, &c.

ALSO

Silver Steel, Clipper & Harvest Victor Grain Scythes,
Common Pattern & Spear Point Hay Knives.

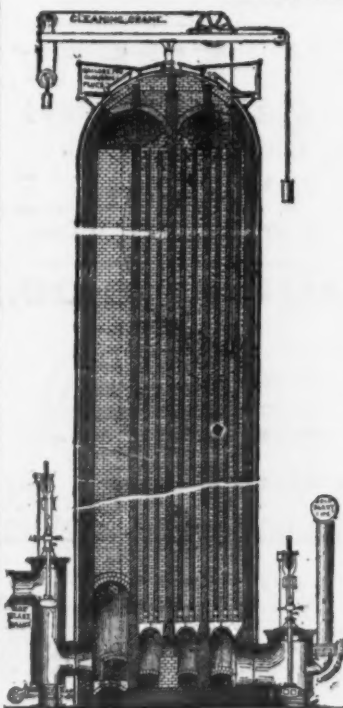
ALSO

Corn Knives, Bush & Weed Scythes.

WITHEROW & GORDON, ENGINEERS.

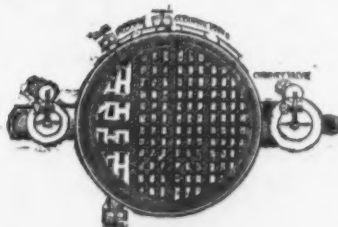
Whitwell Fire-Brick

HOT-BLAST STOVES



Contract for erecting the same. Also, for Building and Replacing all types of Blast Furnaces. Combining Economy with Efficiency and Modern Improvements, wherein the output of Furnaces is increased fully 50 per cent. and the fuel consumption decreased in the same ratio.

Our Blast Engines, Hoisting Engines, &c., have no superior in strength of parts, duty or economy. We solicit an opportunity to make proposals on Blast Furnaces, Rolling Mill or Steel Works Machinery.



Main Office, 86 Water St., Pittsburgh, Pa.
WORKS, NEW CASTLE, PA.

PATENT WROUGHT IRON SHEAR,

With and Without

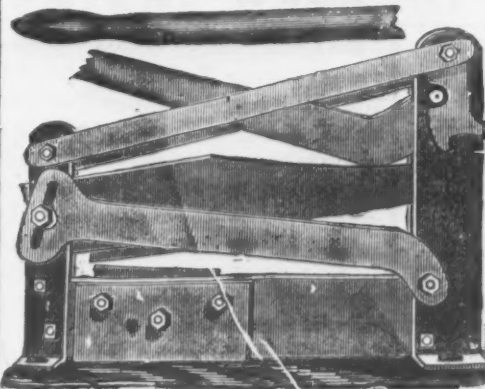
PUNCH ATTACHMENT, FOR IRON AND STEEL.

Our No. 100 Machine will cut 4 1/2 inch round and square and punch 1 1/2 inch hole through 3/4 inch iron. Our No. 104 Machine will cut 4 1/2 inch round and square and punch 1 1/2 inch hole through 3/4 inch iron. Our No. 105 Machine will cut 4 1/2 inch round and square. Our No. 106 Machine will cut 4 1/2 inch round and square. Occupies a space of 2 1/2 inches, weighs from 200 to 300 lbs., made of wrought iron and steel. It is built so exceedingly strong that two men cannot injure it. Prices from \$30 to \$45. Liberal Discount to the trade.

CLEVELAND HARDWARE CO.,

CLEVELAND, OHIO;

Manufacturers of
STERLING ANTI-FRICTION
BARN-DOOR HANGERS.
Send for Illustrated Circular.



J. STEVENS & CO.,

Chicopee Falls, Mass.

P. O. Box 224.

MANUFACTURERS OF SPRING CALIPERS AND DIVIDERS

Also, Surface Gauges and Counter Sinks, Stevens' Patent Breech-Loading Sporting Rifles, double and single barrel; Shot Guns, Pocket Rifles, Pocket Pistols, and the noted Hunters' Pet Rifles. Our Shooting Gallery Rifle is the favorite everywhere.



VERMONT SNATH CO.,

MANUFACTURERS OF THE

No. 00 and 000 Patent Swing Socket Snaths.
SPRINGFIELD, VERMONT.

Represented in New York by LAMSON & GOODNOW MFG. CO.

WM. F. FOREPAUGH, JR. & BROS.

Manufacturers of SUPERIOR OAK TANNED

LEATHER BELTING.

W. Cor. Randolph and Jefferson Sts., PHILADELPHIA.

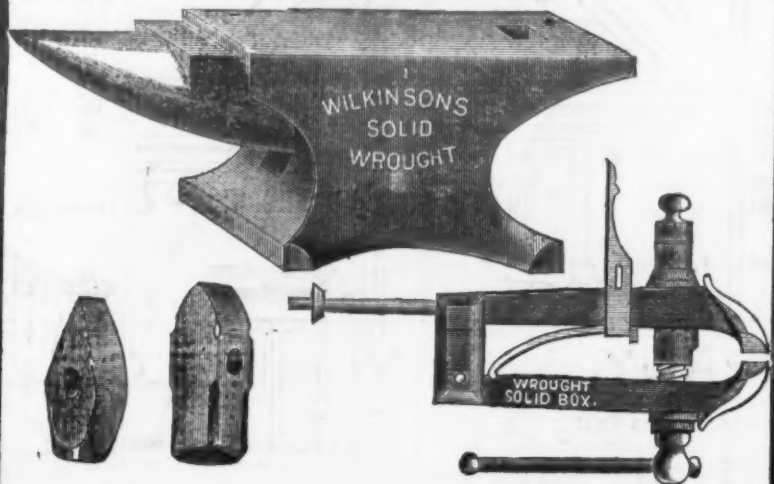
ANVILS & VISES.

Joshua Wilkinson & Sons,
DUDLEY, ENGLAND.

Manufacturers of

Solid Wrought Steel Face Anvils,
Wrought Solid Box Vises,
Wrought Steel Face Hammers.

In quality and finish, and in the mode of manufacture, these goods are identical with "Wrights," being made by the same workmen in adjoining factories at Dudley, England.



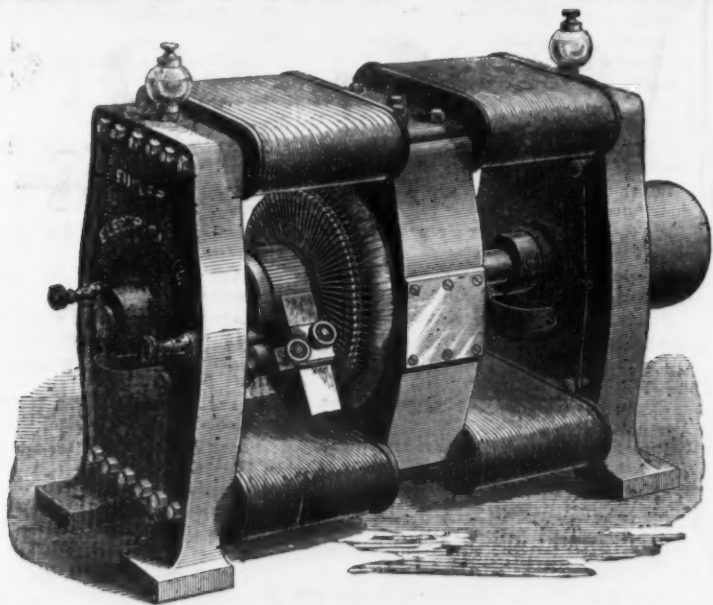
A full assortment will be kept in stock by the Agents, and deliveries made in large lots, f. o. b. at Liverpool, New York or Philadelphia. Small lots delivered from Warehouse at Philadelphia only.

NEWLIN & YARDLEY,
Sole Agents for the United States,
PHILADELPHIA.

Agents for "CROWN" Crane Chains, and
"Best Proved" Chains of all sizes.

NEW YORK DEPOT: 83 Maiden Lane.
THOMAS S. NEWLIN,
Agent for New York City and New England States.
Deliveries for Middle, Western and Southern States made from Philadelphia.

ELECTRIC LIGHT.



THE FULLER ELECTRICAL COMPANY, having perfected their system of Electric Lighting, are prepared to furnish the Improved Gramme Dynamo Electric Machines and Electric Lamps, either for single lights or for from 2 to 20 lights in one circuit. This apparatus is unexcelled for durability, steadiness of light and economy of power, and requires less attention than any other.

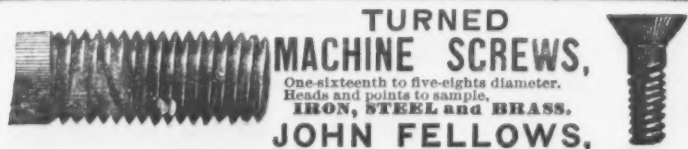
For price list and further particulars apply to

THE FULLER ELECTRICAL COMPANY,
44 East Fourteenth Street, NEW YORK.

STATIONARY AND PORTABLE
STEAM ENGINES,
Shafting, Hangers, Pulleys and Gearing.

SAW MILLS,
Hoisting Engines and Mining Machinery.

Address, **LANE & BODLEY CO.,**
John and Water Streets, CINCINNATI, OHIO, U. S. A.

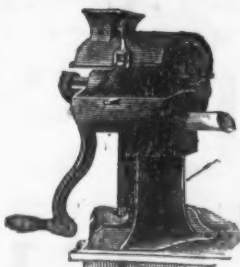


TURNED MACHINE SCREWS,
One-sixteenth to five-eighths diameter.
Heads and points to sample.
IRON, STEEL and BRASS.
JOHN FELLOWS,

Successor to LYON & FELLOWS. Factory and Office, 14 Durham Place, Williamsburgh, N. Y.

Kieser's Gem. Kieser's No. 55

Double
Shearing
Cut.
Solid
Cast
Steel
Blades.



Patented Sept. 14, 1880.

Family Meat Cutters are the best made.

Every family should have one. Will thoroughly cut Raw or Cooked Beef or Pork, Vegetables, Cucumbers, Fine Apples, &c. Will cut forty pounds sausage meat an hour.
Every Druggist should have one for cutting Roots, Vanilla Beans, &c.
Easily worked. Easily cleaned. Will not get out of order. Ask your dealer for them.
Send a postal for Circular with testimonials.
Will send one as sample by express upon receipt of \$2.00.



Are Made on the Same Principle as the Gem Meat Cutters,

But with capacity to cut 100 pounds Pork an hour.

Will send one as sample upon receipt of \$3.00. Our No. 1 Butcher, for hand or power, will cut 300 pounds an hour.
Our No. A Butcher for power, will cut 200 pounds an hour.
We warrant our Cutters to do the work more thoroughly than any other machine made.

Also Sole Manufacturers of

KIMBALL'S PATENT SHOVELS & SPADES,
BOSS PATENT MOLASSES GATES,
LOCKWOOD'S PATENT HOES.

KIMBALL SHOVEL CO.,

Office, No. 67 German St., Baltimore, Md.



RAILROAD TRACK
SCALES.

RIEHLÉ BROS.
STANDARD
SCALES
AND
TESTING MACHINES

PHILADELPHIA,
50 South 4th St.
NEW YORK,
115 Liberty Street.
PITTSBURGH,
Liberty St., cor. 7th av.
ST. LOUIS,
609 North Third St.
NEW ORLEANS,
143 Gravier Street.
CHICAGO,
167 Washington Street.

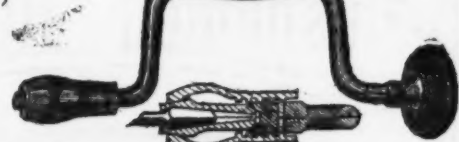
JOHN S. FRAY,

Successor to FRAY & PIGG, Bridgeport, Ct.



Spofford Bit Brace.

The Spofford Bit Brace is made under Letters Patent of the U. S. A., granted to N. Spofford, March 25, 1880, assigned to Fray & Pigg, and now held by John S. Fray, Mr. Pigg having retired from the firm.
All Iron, Five Sizes.
No. 7.....7 inch sweep.
No. 8.....8 " "
No. 9.....9 " "
No. 10.....10 " "
No. 11.....11 " "
No. 12.....12 " "
No. 13.....13 " "
No. 14.....14 " "
No. 107.....7 inch sweep.
No. 108.....8 " "
No. 109.....9 " "
No. 110.....10 " "
No. 111.....11 " "
No. 112.....12 " "
No. 113.....13 " "
No. 114.....14 " "
No. 70.....7 inch sweep.
No. 71.....8 " "
No. 72.....9 " "
No. 73.....10 " "
No. 74.....11 " "
No. 75.....12 " "
No. 76.....13 " "
No. 77.....14 " "



Spofford Sleeve Brace.



Patent Steel Tube and Flue Brush.

Best in the market.
Made any size required.
Combines the properties of a
Scraper and Brush.
Full stock always on hand.

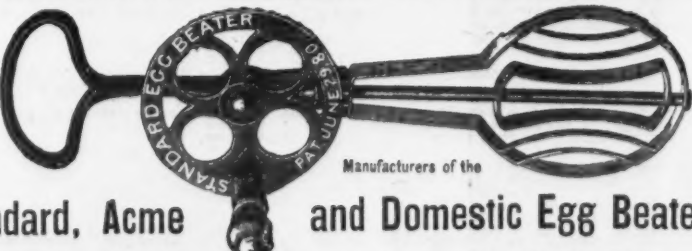
L. B. FLANDERS MACHINE WORKS,
1025 Hamilton St., Philadelphia, Pa.

PURE TURKISH EMERY,

Quartz, Pumice and Rotten Stone, Crocus, Rouge, Glue, Sand
Paper, Emery Paper and Cloth, Emery Wheels, &c.

WALPOLE EMERY MILLS,
Mills, So. Walpole. 114 MILK ST., BOSTON, MASS.

STANDARD MANUFACTURING CO.,

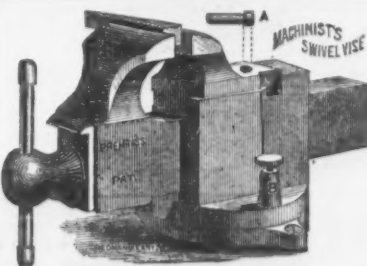


Manufacturers of the

Standard, Acme and Domestic Egg Beaters.

Also, Housefurnishing Goods generally. Circulars and samples on application.

131 PORTLAND STREET, - - - - - BOSTON, MASS.



PRENTISS' PAT. VISES,

Adjustable Jaw.

Stationary and Pat. Swivel Bottoms.

Adapted to all kinds of Vise Work.

Sold by the Trade.

PRENTISS VISE CO.,

23 Day Street, New York,

Sole Proprietors.

Send for circular

THE

DEXTER CARRIAGE SPRING

Combines
Strength,
Durability,
Beauty. It is
Graceful,
Noiseless,
Light and Easy.

The DEXTER SPRING is the most perfect Carriage Spring ever invented. Wherever it is known it is rapidly superseding all others for pleasure vehicles. It is especially recommended for use on the rough roads of new countries, as its peculiar construction relieves the strain on the vehicle and shock to the passenger, while the high grade of material used reduces the probability of breakage to a minimum.
For circulars, prices, &c., address

DEXTER SPRING CO., Hulton, near Pittsburgh, Pa., U. S. A.

"Climax" BARREL TANK ATTACHMENTS.



"Climax"

Is designed to be attached to any Barrel or Cask, thereby converting the same into a temporary Tank, fitted with an effective Pump, and while protecting contents from dirt and waste, the owner has entire control of same, by simply locking the cover. It entirely does away with the labor and waste attendant upon emptying Barrels into any of the numerous Metal Tanks, while securing all the conveniences of the same, at a GREATLY REDUCED COST. The Apparatus can be adjusted in a few moments to a Barrel of any size, and so quickly shifted to another when contents are exhausted, the process of connecting being very simple. It is as compact in form as is consistent with perfect efficiency, and we feel confident that a trial will demonstrate its practical value.

WHO HAS USE FOR IT?

EVERY ONE

Who buys in bulk any of the various kinds of Oils, or in fact any Fluid that can be Pumped;

Every Mill, Factory, or Work-Shop, where Oils or other fluids are used, and every store where such fluids are retailed, will find the "CLIMAX" just what they require.

Send for Circular to

PANCOAST & MAULE,
Nos. 243 & 245 SO. THIRD STREET,
PHILADELPHIA, PA.

Grindstones, Emery, &c.

Walter R. Wood,
GRINDSTONES.

Berea, O., Nova Scotia, & other brands
283 and 285 Front Street, New York.

GEO. CHASE,

The largest manufacturers in the world of

OIL STONE

Of all description.
107th Street and Harlem River.
Send for Illustrated Price List. NEW YORK.



McDERMOTT & BERA STONE CO.,
Manufacturers of
GRINDSTONES,
Cleveland, Ohio.

ATLANTIC STONE CO.,
Quarrymen and Stone Merchants.
GRINDSTONES

of genuine Nova Scotia and other grits from our own quarries. Mounted stones and fittings, scythe and oil stones, polishing grits, &c.

474 & 478 Atlantic Ave., Boston, Mass.

LOMBARD & CO.,
Importers and Dealers in all kinds of
GRINDSTONES,

Cor. Lewis Wharf & Atlantic Ave., Boston.
Stones for Machinists, Carpenters, Farmers and Glass Cutters constantly on hand and cut to order.

OHIO GRINDSTONES.

Superior Ohio Grindstones, manufactured by P. L. Cole, Constitution, Ohio, will be supplied to the Southern trade at lowest possible rates by

S. B. LOWE, Southern Agent,
Chattanooga, Tenn.

EMERY.
Large stock on hand, especially suited to Saw and Shovel Manufacturers, at bottom prices.

Importers and Manufacturers of
PURE TURKISH EMERY.
* **IRVINE, TOWNSEND & CO.,**
123 Chambers St., New York.
Send for quotations and samples.

BELLAIRE NAIL WORKS,

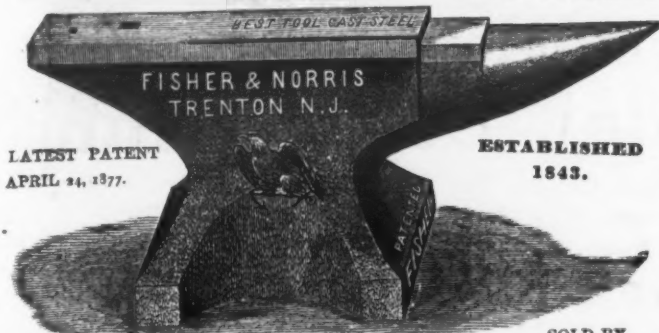
PIG IRON AND NAILS,

Manufacture the Celebrated Brand of

BELLAIRE NAILS

Office and Works, - - BELLAIRE, OHIO.

THE "EAGLE" ANVIL. WARRANTED!!

LATEST PATENT
APRIL 24, 1877.ESTABLISHED
1843.

Better than the Best English Anvil.

Face in one piece, of BEST TOOL CAST STEEL. PERFECTLY WELDED, perfectly true; of hardest temper and never to come off or "settle." It does not bounce the hammer back, and therefore can do more work with lighter hammer. Horn of tough untempered steel, never to break or bend. Only Anvil made in United States fully warranted as above. None genuine without our trade-mark.

N. B.—That the "Eagle" Anvil is the only one made at Trenton, New Jersey, and it must not be mistaken for an Anvil in the market called Trenton, but which is really of foreign manufacture, and an imported imitation of the English Anvil.

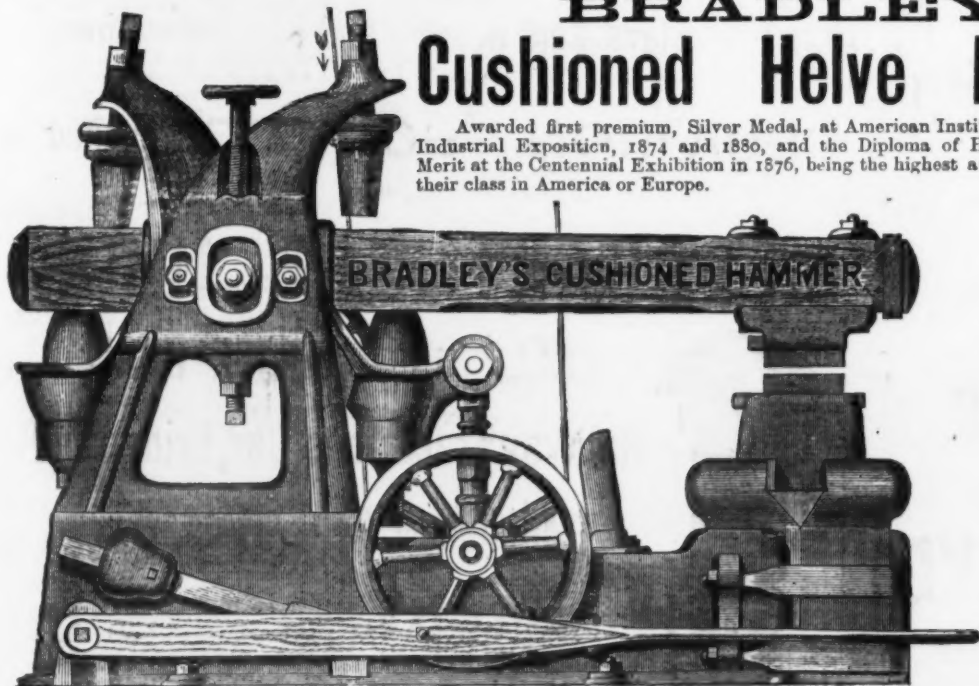
SOLD BY

New York—RUSSELL & ERWIN MANUFACTURING COMPANY, DUBRIE & McCARTY, TENNIS & WILSON.
Philadelphia—JAMES C. HAND & CO. Boston—GEORGE H. GRAY & DANFORTH.
Baltimore—W. H. COLE & SONS, JOHN R. KELSO, JR.
Louisville—W. B. BELKNAP & CO. Cincinnati—POST & CO. Cleveland—THE LAKE ERIE IRON CO.

BRADLEY'S

Cushioned Helve Hammer.

Awarded first premium, Silver Medal, at American Institute Fair, 1873, Cincinnati Industrial Exposition, 1874 and 1880, and the Diploma of Honor and Grand Medal of Merit at the Centennial Exhibition in 1876, being the highest award given any goods of their class in America or Europe.



BRADLEY & COMPANY,
Established 1832.
SYRACUSE, N. Y.

IT HAS MORE GOOD POINTS,
DOES MORE AND BETTER WORK,
TAKES LESS POWER, REPAIRS,
COSTS LESS FOR THE WORLD,
THAN ANY HAMMER IN THE WORLD.

B. FITTS' PATENT MAGNETIC METAL SEPARATOR.

MAGNETIC METAL SEPARATOR.

The accompanying cut represents a view of a recently invented machine for separating iron turnings, filings, &c., from brass, composition and other material. Its capacity and utility for this kind of work surpasses anything ever before offered to the public, doing its work most thoroughly, and with the least amount of labor or trouble. The machine is not only a great labor-saving device, but brass stock treated with it is much improved, as it is thoroughly cleansed that it may be used for the best of work.

The machine may also be used for separating iron from emery.

TESTIMONIALS.

From the Walworth Manufacturing Co., Boston.
BOSTON, Jan. 18, 1879.
Mr. Ezra Sawyer, Worcester: Of the many methods we have practiced in separating iron from brass turnings and filings, we have found none equal to your machine. Very truly yours,
E. C. HAMMER, Treas.

From the Benedict and Burnham Mfg. Company, Waterbury, Conn.
WATERBURY, Conn., Aug. 12, 1879.
Ezra Sawyer, Esq., Worcester.—DEAR SIR: We have used one of B. Fitts' Patent Magnetic Metal Separators for eighteen months, and can recommend it as the best thing we have ever seen for separating metals, and have no doubt it has more than paid for itself in its use. UNION WATER METAL CO.
WORCESTER, Sept. 1, 1879. J. C. OTIS, Treas.

From Peck Brothers & Co., New Haven, Conn.
NEW HAVEN, Conn., Sept. 3, 1879.
Ezra Sawyer, Esq., Worcester.—DEAR SIR: We are pleased to inform you that the machine we purchased of you for cleaning our turnings and sweepings works admirably, and does its work thoroughly. It will very soon earn all it cost us. Respectfully yours,
M. PECK, Treas. PECK BROS. & CO.

From Rice, Barton & Fales Machine and Iron Co., Worcester, Mass.
WORCESTER, Mass., Sept. 4, 1879.
To Whom it may concern: We have had in use for several months one of B. Fitts' Patent Magnetic Metal Separators, and it gives us satisfaction, effecting a saving in time and material. Yours respectfully,
GEO. M. RICE, Treas.

From Brown & Brothers, Waterbury, Conn.
WATERBURY, Conn., Sept. 4, 1879.
Ezra Sawyer, Esq., Worcester, Mass.—DEAR SIR: We have used your Magnetic Metal Separator several months; it works to our satisfaction, and we cheerfully give it our recommendation. Yours truly,
H. VAN DUSEN, Agt. BROWN & BROTHERS.

Manufactured by
EZRA SAWYER, 33 Hermon Street, WORCESTER MASS.

Delusion Rat and Mouse Trap,

Manufactured by

CLAUDIUS JONES & CO.,
ERIE, Penna.

This is the only Self-setting Trap on the market, and the most successful.

CLAUDIUS JONES & CO.,
ERIE, Penna.

THE ULSTER SLED.

The best, most durable and easiest running Sled in the market. Outlets all others.

SHERIDAN VELOCIPEDES,
the latest out. Send for catalogue and price list to

CROSBY, SAHLER & CO.,
Rondout, N. Y., Manufacturers,

W. H. QUINN & CO., Sole Agents, 79 Chambers St., New York.

SEND FOR ILLUSTRATED PRICE LIST.



ACCOUNT BOOKS

ALL SIZES BINDINGS & QUALITIES IN STOCK
RULED BOUND & PRINTED TO ORDER

UNITED MFG. STATIONERS,
P. O. Box 2044, New York.

CUMMINGS' ARCHITECTURAL DETAILS,

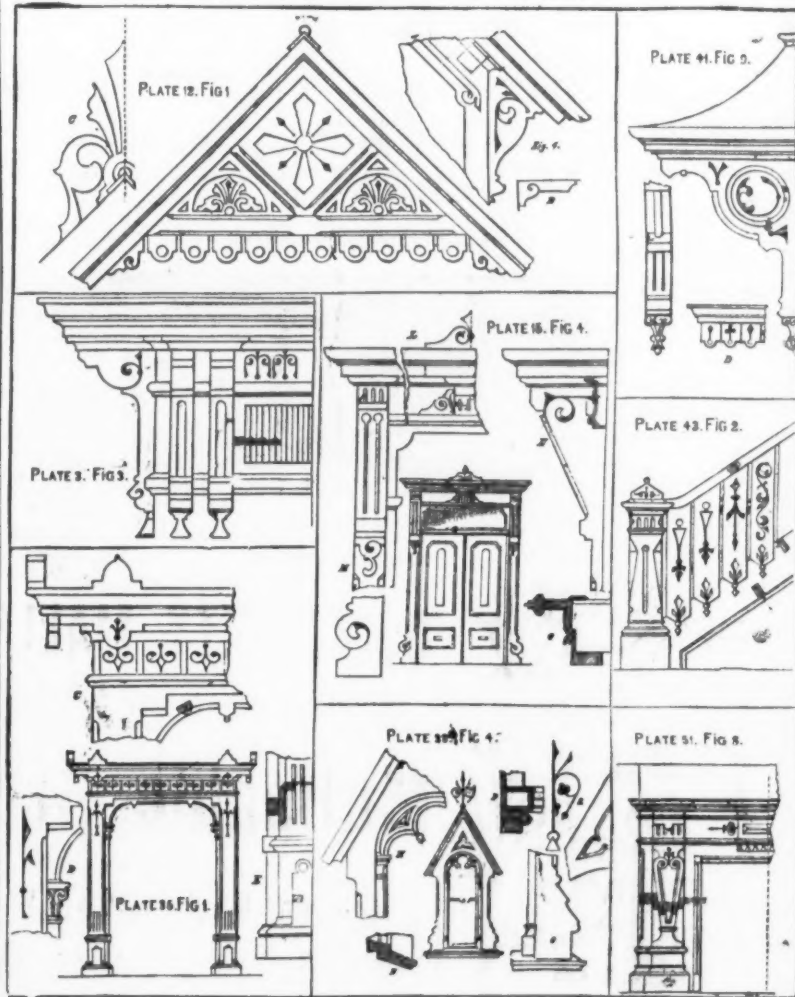
CONTAINING 387 DESIGNS AND 667 ILLUSTRATIONS

Of the Various Parts needed in the Construction of Buildings,
Public and Private, both for the City and Country; also
Plans and Elevations of Houses, Stores, Cottages,
and other Buildings.

By M. F. CUMMINGS, M. A., Architect.

Associate Author of "Architecture, by Cummings & Miller."

(CUTS REDUCED FROM PLATES INDICATED.)



LIST OF PLATES.

- PLATE 1.—Front Elevation of the Troy Times Building, Troy, N. Y.
PLATE 2.—Designs for Cornices for City Buildings and Street Fronts. Four figures.
PLATE 3.—Designs for Cornices for Street Fronts and for Suburban Buildings. Six figures.
PLATE 4.—Designs for Cornices of Street Fronts and Suburban Buildings. Nine figures.
PLATE 5.—Brick Cornices. Four figures.
PLATE 6.—Designs for Cornices for Country Houses. Ten figures.
PLATE 7.—Designs for Cornices for Store Fronts and for Steep and French Roofs. Eleven figures.
PLATE 8.—Elevations of Fronts for City Dwelling Houses. Three figures.
PLATE 9.—Designs for French Roofs and their Finish. Two figures.
PLATE 10.—Designs for French Roofs and their Finish. Four figures.
PLATE 11.—Designs for Gable Finish and Cornices for Cottages. Nine figures.
PLATE 12.—Designs for Cottage Cornices and Gable Finish. Six figures.
PLATE 13.—Designs for Cornices and Gable Finish. Nine figures.
PLATE 14.—Designs for Front Entrance Doors. Three figures.
PLATE 15.—Designs for Front Entrance Doors for Dwelling Houses. Four figures.
PLATE 16.—Front Elevations and Plans for Dwelling Houses. First and Second Stories.
PLATE 17.—Design for Front Entrance Doors and Bay Window. One figure.
PLATE 18.—Design for Front Doors and Bay Window. One figure.
PLATE 19.—Designs for Single Windows, having Outside Casings or Architraves. Nine figures.
PLATE 20.—Designs for Windows with Arched Heads. Nine figures.
PLATE 21.—Designs for Double or Mullion Windows. Nine figures.
PLATE 22.—Designs for Exterior Finish of Windows. Five figures.
PLATE 23.—Designs for Bay Windows. Two figures.
PLATE 24.—Front Elevation and Plans for Dwelling House. First and Second Stories.
PLATE 25.—Designs for Bay Windows.
PLATE 26.—Designs for Dormer Windows in French Roofs. Four figures.
PLATE 27.—Designs for Dormer Windows in French Roofs. Nine figures.
PLATE 28.—Designs for Dormer Windows in French and High Pitched Roofs. Five figures.
PLATE 29.—Designs for Window Caps and Sills. Details A to E.
PLATE 30.—Designs for a Tower. Three figures.
PLATE 31.—Designs for a Tower. Two figures.
PLATE 32.—Front Elevations of Two Brick Buildings.
PLATE 33.—Design for a Tower. One figure.
PLATE 34.—Designs for Porches. Three figures.
PLATE 35.—Designs for Porches. Three figures.
PLATE 36.—Designs for Piazzas. Six figures.
PLATE 37.—Designs for Piazzas. Five figures.
PLATE 38.—Designs for Piazzas. Three figures.
PLATE 39.—Designs for Balconies and Railings. Nine figures.
PLATE 40.—Elevation and Plans of Dwelling House. First and second stories.
PLATE 41.—Designs for Railings and Canopies. Nine figures.
PLATE 42.—Designs for Belt-Courses, Water Tables and Corner Boards. Nine figures.
PLATE 43.—Designs for Stairs and Outside Steps. Five figures.
PLATE 44.—Designs for Fronts of Stores. Two figures.
PLATE 45.—Designs for Store Fronts. Two figures.
PLATE 46.—Designs for Wainscoting. Four figures.
PLATE 47.—Designs for Inside Doors, Wainscoting and Inside Finish, for Doors and Windows. Seven figures.
PLATE 48.—Front Elevation and Plans for Court House. First and second stories.
PLATE 49.—Designs for Chimney Caps. Six figures.
PLATE 50.—Designs for Ceilings and Stucco Cornices and Ribs. Four figures.
PLATE 51.—Designs for Fences and Mantels. Nine figures.
PLATE 52.—Moldings. Nine figures.
PLATE 53.—Moldings. Twenty two figures.
PLATE 54.—Designs for Inside Casings for Doors and Windows, and for Baseboards. Thirty-six figures.
PLATE 55.—Front Elevations and Plans of Three Cottages. First and second stories. Three figures.
PLATE 56.—Three Designs for Houses of Moderate Cost. Three figures.

Royal Quarto, Price, Postpaid, Reduced from \$10 to \$6.

For sale by

DAVID WILLIAMS,

83 Reade Street, New York.

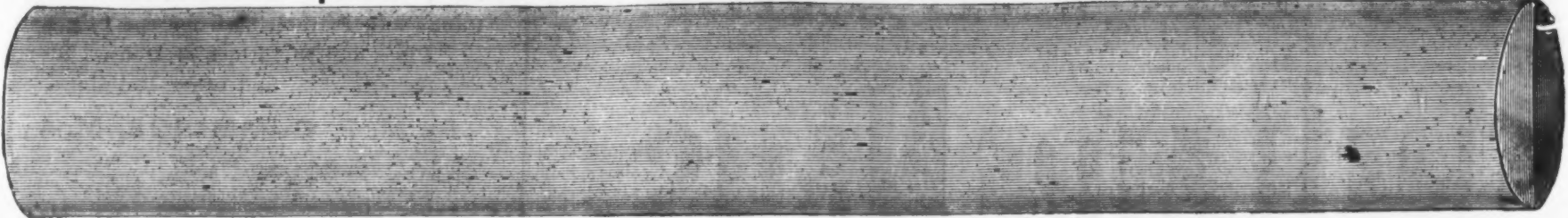


LIST OF BRANDS.

Old,
Reliable,
Indian Pond,
(Red End),
Premium,
Union,
White Mountain,
Letoile,
Diamond Grit,
Fisherman (Rough),
Boss Hacker (Oval),
Lamoille,
Willoughby Lake,
Green Mountain,
Black Diamond,
Ragg (9 and 10 inch),
Mowing Machine,
Paper Mill Stone,
Vermont Darby,
Chocolate,
Axbitts,

WRITE ME FOR PRICES.

A. F. PIKE, Pike Station, Crafton Co., N. H., U. S. A.
The World's Headquarters for Pike's Celebrated Blue Stone for Scythes and all Edge Tools.



Indian Pond (Red End) No. 1. Extra. Perfect Stone, in 1/2 and 3/4 gross boxes, weight 140 lbs. to the gross.



Packed in 1/4 gross, Slide Cover Boxes, 1 gross in a crate.



Packed in 1/4 gross, Slide Cover Boxes, 1 gross in a crate.



We are now exclusive manufacturers of this celebrated Tree, Shrub and Hedge Trimmer. Special inducements to buyers for export. Send for our illustrated circular and price list.

E. S. LEE & CO.,
Rochester, N. Y.



RAY HUBBELL,
Patentee and Sole Manuf' in U. S. and Canada,
Northville, Fulton Co., N. Y.

Grant Fan Mill & Cradle Co.

Manufacturers of
Grant's Grain, Coffee, Rice, Cochineal
and Pimento Fans,



Metal Workers' Crayons.

More convenient and cheaper than either com
mon or French chalk. For manufacturers of all
sheet metals, metal workers, machinists, black-
smiths, etc. Send for sample and price list.

D. M. STEWARD,
Sole Manufacturer,
231 State Avenue, Cincinnati, Ohio.

QUEEN CITY MALLEABLE IRON CO.,
Limited,
Make all Shapes and Sizes of

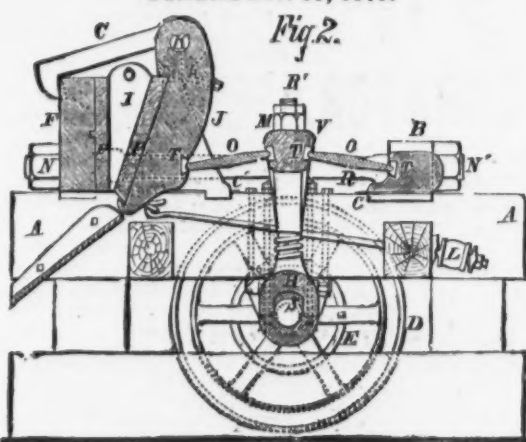
Malleable Iron Castings
known to the trade. Our specialty is

WELDING MALLEABLE CASTINGS.

Guaranteed to weld perfectly and capable of being drawn under a hammer. Address,
N. W. Corner Vine and Second Streets,
CINCINNATI.

THE NEW BLAKE CRUSHER,
OR,
BLAKE'S
CHALLENGE ROCK BREAKER.

Patented Nov. 18, 1879.

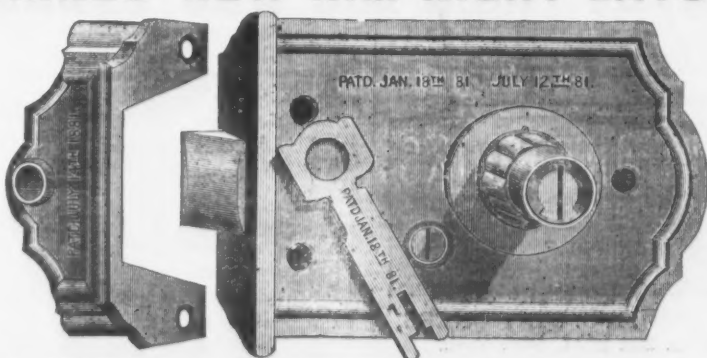


The most economical and reliable Crusher in use. Superior in all respects to our old style Blake Crushers, and rapidly superseding them and all imitations. For railway ballast, Macadam road making, and crushing of ores of all kinds it has no competitor. This machine dispenses with cast iron frame and pitman of our old forms. All strains are on wrought iron or steel.

Awarded medals of superiority by judges of American Institute Fair, New York City, 1879 and 1880, where it was exhibited in competition with our old forms of Crusher.

BLAKE CRUSHER CO.,
Sole Makers,
NEW HAVEN, CONN.

BARNES' NEW RIM NIGHT LATCH.



H. F. SISE, Sole Agent, 100 Chambers St., New York.

PETER CERLACH & CO.,

MANUFACTURERS OF

CIRCULAR, LONG AND CYLINDER SAWS,
ICE TOOLS, BUTCHERS' MEAT ROCKERS, STANDARD FLUE SCRAPERS.

ALSO, BUILDERS OF

Improved Stave, Keg, Heading and Barrel Machinery.
CLEVELAND, OHIO.

ELBA IRON & BOLT CO., Limited.

MANUFACTURERS OF

MERCHANT BAR IRON,
SKELP IRON, SPLICE BARS,
Railway Track Bolts, Car, Bridge and
Machinery Bolts, Nuts, &c.



We invite the attention of RAILROAD MEN especially, to our make of SPLICE BARS and Track Bolts. Using the best brands of REFINED IRON, and paying close attention to the finish of our manufactures, we are enabled to offer our patrons BOLTS, NUTS, SPLICE BARS, &c., of excellent quality.

Our works have been enlarged within a few years; all orders are now executed with promptness; all our work guaranteed.

SEND FOR PRICE LISTS AND INFORMATION TO

ELBA IRON & BOLT CO., Limited,
PITTSBURGH, PA.

COAL, TIME **SAVED!** **BY USING**
And LABOR **MORGAN'S**
VARIABLE BLAST TUYERE IRON.

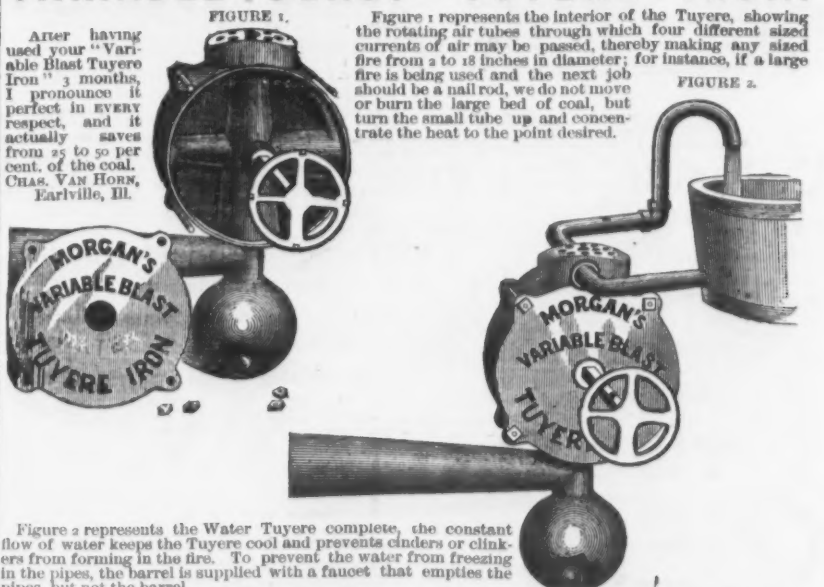


Figure 2 represents the Water Tuyere complete, the constant flow of water keeps the Tuyere cool and prevents cinders or clinkers from forming in the fire. To prevent the water from freezing in the pipes, the barrel is supplied with a faucet that empties the pipes, but not the barrel.

All the dirt from the fire sifts through the perforated fire cap into the dirt box, from which it is blown by the blast when the ball valve is raised for that purpose. Send for price list and discounts.

A. W. MORGAN, Patentee and Manufacturer,
Office, 25 Vance Block,
INDIANAPOLIS, IND.

NEW YORK WHOLESALE PRICES, October 5, 1881.

METALS.

IRON.—DUTY Bars, 1 to 140 # # # Sheet, Band	
1000 and 3000, 14 to 140 # # # provided, that none	
of the above iron shall pay a less rate of duty than 14	
per cent. Pig, 1 # # # ton: Polished Sheet, 1 # # #	
Wrought Scrap, 1 # # # ton: Cast Scrap, 1 # # #	
Flatiron 100 # # # ton: Boiler and Plate, 140 # # #	
IRON—AMERICAN	
Foundry No. 10	25.00
No. 12	25.00
Gray Forge	25.00 @ 21.50
Ballston	25.00
Carbure	25.00
Cottrell	25.00
Glenbrook	25.00 @ 25.50
Gardner	25.00
Langdon	25.00
IRON—FOREIGN	
Steel (at mill) (1881 delivery)	25.00 @ 25.00
Old Rail D H	25.00
Wrought Scrap 1 # # # ton	25.00 @ 31.00
Star Iron from store	
14 to 16 in. round and square	25.00
1 to 16 in. x 1/2 in.	25.00
1 to 16 in. x 1/4 in.	25.00
1 to 16 in. x 1/8 in.	25.00
1 to 16 in. x 1/16 in.	25.00
1 to 16 in. x 1/32 in.	25.00
1 to 16 in. x 1/64 in.	25.00
1 to 16 in. x 1/128 in.	25.00
1 to 16 in. x 1/256 in.	25.00
1 to 16 in. x 1/512 in.	25.00
1 to 16 in. x 1/1024 in.	25.00
1 to 16 in. x 1/2048 in.	25.00
1 to 16 in. x 1/4096 in.	25.00
1 to 16 in. x 1/8192 in.	25.00
1 to 16 in. x 1/16384 in.	25.00
1 to 16 in. x 1/32768 in.	25.00
1 to 16 in. x 1/65536 in.	25.00
1 to 16 in. x 1/131072 in.	25.00
1 to 16 in. x 1/262144 in.	25.00
1 to 16 in. x 1/524288 in.	25.00
1 to 16 in. x 1/1048576 in.	25.00
1 to 16 in. x 1/2097152 in.	25.00
1 to 16 in. x 1/4194304 in.	25.00
1 to 16 in. x 1/8388608 in.	25.00
1 to 16 in. x 1/16777216 in.	25.00
1 to 16 in. x 1/33554432 in.	25.00
1 to 16 in. x 1/67108864 in.	25.00
1 to 16 in. x 1/134217728 in.	25.00
1 to 16 in. x 1/268435456 in.	25.00
1 to 16 in. x 1/536870912 in.	25.00
1 to 16 in. x 1/1073741824 in.	25.00
1 to 16 in. x 1/2147483648 in.	25.00
1 to 16 in. x 1/4294967296 in.	25.00
1 to 16 in. x 1/8589934592 in.	25.00
1 to 16 in. x 1/17179869184 in.	25.00
1 to 16 in. x 1/34359738368 in.	25.00
1 to 16 in. x 1/68719476736 in.	25.00
1 to 16 in. x 1/137438953472 in.	25.00
1 to 16 in. x 1/274877906944 in.	25.00
1 to 16 in. x 1/549755813888 in.	25.00
1 to 16 in. x 1/1099511627776 in.	25.00
1 to 16 in. x 1/2199023255552 in.	25.00
1 to 16 in. x 1/4398046511104 in.	25.00
1 to 16 in. x 1/8796093022208 in.	25.00
1 to 16 in. x 1/17592186044416 in.	25.00
1 to 16 in. x 1/35184372088832 in.	25.00
1 to 16 in. x 1/70368744177664 in.	25.00
1 to 16 in. x 1/140737488355328 in.	25.00
1 to 16 in. x 1/281474976710656 in.	25.00
1 to 16 in. x 1/562949953421312 in.	25.00
1 to 16 in. x 1/1125899906842624 in.	25.00
1 to 16 in. x 1/2251799813685248 in.	25.00
1 to 16 in. x 1/4503599627370496 in.	25.00
1 to 16 in. x 1/9007199254740992 in.	25.00
1 to 16 in. x 1/18014398509481984 in.	25.00
1 to 16 in. x 1/36028797018963968 in.	25.00
1 to 16 in. x 1/72057594037927936 in.	25.00
1 to 16 in. x 1/144115188075855872 in.	25.00
1 to 16 in. x 1/288230376151711744 in.	25.00
1 to 16 in. x 1/576460752303423488 in.	25.00
1 to 16 in. x 1/1152921504606846976 in.	25.00
1 to 16 in. x 1/2305843009213693952 in.	25.00
1 to 16 in. x 1/4611686018427387904 in.	25.00
1 to 16 in. x 1/9223372036854775808 in.	25.00
1 to 16 in. x 1/18446744073709551616 in.	25.00
1 to 16 in. x 1/36893488147419103232 in.	25.00
1 to 16 in. x 1/73786976294838206464 in.	25.00
1 to 16 in. x 1/147573952589676412928 in.	25.00
1 to 16 in. x 1/295147905179352825856 in.	25.00
1 to 16 in. x 1/590295810358705651712 in.	25.00
1 to 16 in. x 1/1180591620717411303424 in.	25.00
1 to 16 in. x 1/2361183241434822606848 in.	25.00
1 to 16 in. x 1/4722366482869645213696 in.	25.00
1 to 16 in. x 1/9444732965739290427392 in.	25.00
1 to 16 in. x 1/18889465931478580854784 in.	25.00
1 to 16 in. x 1/37778931862957161709568 in.	25.00
1 to 16 in. x 1/75557863725914323419136 in.	25.00
1 to 16 in. x 1/151115727451828646838272 in.	25.00
1 to 16 in. x 1/302231454903657293676544 in.	25.00
1 to 16 in. x 1/604462909807314587353088 in.	25.00
1 to 16 in. x 1/1208925819614629174706176 in.	25.00
1 to 16 in. x 1/2417851639229258349412352 in.	25.00
1 to 16 in. x 1/4835703278458516698824704 in.	25.00
1 to 16 in. x 1/9671406556917033397649408 in.	25.00
1 to 16 in. x 1/19342813113834066795298816 in.	25.00
1 to 16 in. x 1/38685626227668133590597632 in.	25.00
1 to 16 in. x 1/77371252455336267181195264 in.	25.00
1 to 16 in. x 1/154742504910672534362390528 in.	25.00
1 to 16 in. x 1/309485009821345068724781056 in.	25.00
1 to 16 in. x 1/618970019642690137449562112 in.	25.00
1 to 16 in. x 1/1237940039285380274899244224 in.	25.00
1 to 16 in. x 1/2475880078570760549798488448 in.	25.00
1 to 16 in. x 1/4951760157141521099596976896 in.	25.00
1 to 16 in. x 1/9903520314283042199193953792 in.	25.00
1 to 16 in. x 1/19807040628566084398387907584 in.	25.00
1 to 16 in. x 1/39614081257132168796775815168 in.	25.00
1 to 16 in. x 1/79228162514264337593551630336 in.	25.00
1 to 16 in. x 1/158456325028528675187103260672 in.	25.00
1 to 16 in. x 1/316912650057057350374206521344 in.	25.00
1 to 16 in. x 1/633825300114114700748413042688 in.	25.00
1 to 16 in. x 1/1267650600228229401496826085376 in.	25.00
1 to 16 in. x 1/2535301200456458802993652170752 in.	25.00
1 to 16 in. x 1/5070602400912917605987304341504 in.	25.00
1 to 16 in. x 1/10141204801825835211974608683008 in.	25.00
1 to 16 in. x 1/20282409603651670423949217366016 in.	25.00
1 to 16 in. x 1/40564819207303340847898434732032 in.	25.00
1 to 16 in. x 1/81129638414606681695796869464064 in.	25.00
1 to 16 in. x 1/162259276829213363391593739328128 in.	25.00
1 to 16 in. x 1/324518553658426726783187478656256 in.	25.00
1 to 16 in. x 1/649037107316853453566374957312512 in.	25.00
1 to 16 in. x 1/129807421463706790713274991465024 in.	25.00
1 to 16 in. x 1/259614842927413581426549982930048 in.	25.00
1 to 16 in. x 1/519229685854827162853099965860096 in.	25.00
1 to 16 in. x 1/1038459371709654325706199931720192 in.	25.00
1 to 16 in. x 1/2076918743419308651412399863440384 in.	25.00
1 to 16 in. x 1/4153837486838617302824799726880768 in.	25.00
1 to 16 in. x 1/8307674973677234605649599453761536 in.	25.00
1 to 16 in. x 1/1661534994735446921129919908753072 in.	25.00
1 to 16 in. x 1/3323069989470893842259839817506144 in.	25.00
1 to 16 in. x 1/6646139978941787684519679635012288 in.	25.00
1 to 16 in. x 1/1329227995788357536903935927002576 in.	25.00
1 to 16 in. x 1/2658455991576715073807871854005152 in.	25.00
1 to 16 in. x 1/5316911983153430147615743708010304 in.	25.00
1 to 16 in. x 1/10633823966306860295231487416020608 in.	25.00
1 to 16 in. x 1/21267647932613720590462974832041216 in.	25.00
1 to 16 in. x 1/42535295865227441180925949664082432 in.	25.00
1 to 16 in. x 1/85070591730454882361851899328164864 in.	25.00
1 to 16 in. x 1/170141183460909764723703798656329728 in.	25.00
1 to 16 in. x 1/340282366921819529447407597312659456 in.	25.00
1 to 16 in. x 1/680564733843639058894815194625318912 in.	25.00
1 to 16 in. x 1/1361129467687278117789630389250637824 in.	25.00
1 to 16 in. x 1/2722258935374556235579260778501275648 in.	25.00
1 to 16 in. x 1/5444517870749112471158521557002551296 in.	25.00
1 to 16 in. x 1/10889035741498224942317043114005102592 in.	25.00
1 to 16 in. x 1/21778071482996449884634086228010205184 in.	25.00
1 to 16 in. x 1/43556142965992899769268172456020410368 in.	25.00
1 to 16 in. x 1/87112285931985799538536344912040820736 in.	25.00
1 to 16 in. x 1/174224571863911599077072689824081641504 in.	25.00
1 to 16 in. x 1/348449143727823198154145379648163283008 in.	25.00
1 to 16 in. x 1/696898287455646396308290759296326566016 in.	25.00
1 to 16 in. x 1/1393796574911292792616581518592653132032 in.	25.00
1 to 16 in. x 1/2787593149822585585233163037185306264064 in.	25.00
1 to 16 in. x 1/557518629964517117046632607437061248128 in.	25.00
1 to 16 in. x 1/1115037259929034234093265214871222496256 in.	25.00
1 to 16 in. x 1/223007451985806846818653049974244499512 in.	25.00
1 to 16 in. x 1/446014903971613693637310699948488999024 in.	25.00
1 to 16 in. x 1/892029807943227387274621399896977998048 in.	25.00
1 to 16 in. x 1/1784059615886454774549242799793955996096 in.	25.00
1 to 16 in. x 1/3568119231772909549098485599587911992192 in.	25.00
1 to 16 in. x 1/7136238463545819098196971199175823984384 in.	25.00
1 to 16 in. x 1/14272476927091638196393742398351456768768 in.	25.00
1 to 16 in. x 1/2854495385418327639278748479670291353536 in.	25.00
1 to 16 in. x 1/5708990770836655278557496959340582707072 in.	25.00
1 to 16 in. x 1/11417981541673310557114993918681165414144 in.	25.00
1 to 16 in. x 1/22835963083346621114229987837362330828288 in.	25.00
1 to 16 in. x 1/45671926166693242228459975674724661656576 in.	25.00
1 to 16 in. x 1/91343852333386484456919951349449323113152 in.	25.00
1 to 16 in. x 1/182687704666772968913839902698988646226304 in.	25.00
1 to 16 in. x 1/365375409333545937827679805397977292452608 in.	25.00
1 to 16 in. x 1/73075081866709187565535961079595458490512 in.	25.00
1 to 16 in. x 1/146150163733418375131071922159190916981024 in.	25.00
1 to 16 in. x 1/29230032746683675026214384431838183962048 in.	25.00
1 to 16 in. x 1/58460065493367350052428768863676367924096 in.	25.00
1 to 16 in. x 1/116920130986734700104857537727352735848192 in.	25.00
1 to 16 in. x 1/233840261973469400209715075454705471696384 in.	25.00
1 to 16 in. x 1/467680523946938800419430150909410943392768 in.	25.00
1 to 16 in. x 1/935361047893877600838860301818821887785536 in.	25.00
1 to 16 in. x 1/1870722095787755201677720603637643775571072 in.	25.00
1 to 16 in. x 1/3741444191575510403355441207275287551142144 in.	25.00
1 to 16 in. x 1/7482888383151020806710882414550575102284288 in.	25.00
1 to 16 in. x 1/149657767663020416134217648291011504568576 in.	25.00
1 to 16 in. x 1/29931553532604083226843529658202300911136 in.	25.00
1 to 16 in. x 1/59863107065208166453687059316404601822272 in.	25.00
1 to 16 in. x 1/119726214130416332867374118632809203644544 in.	25.00
1 to 16 in. x 1/239452428260832665734748237265618407289088 in.	25.00
1 to 16 in. x 1/478904856521665331469496474531236814578176 in.	25.00
1 to 16 in. x 1/957809713043330662938992949062473631556352 in.	25.00
1 to 16 in. x 1/1915619426086601325877985898124947263112704 in.	25.00
1 to 16 in. x 1/3831238852173202651755971796249894526225408 in.	25.00
1 to 16 in. x 1/7662477704346405303511943592499789052450816 in.	25.00
1 to 16 in. x 1/15324954408692810607023887184999578104901632 in.	25.00
1 to 16 in. x 1/3064990881738562121404777436999915609803264 in.	25.00
1 to 16 in. x 1/6129981763477124242809554873999831219606528 in.	25.00
1 to 16 in. x 1/1225996352695424848561910974799966243921256 in.	25.00
1 to 16 in. x 1/2451992705390849697123821949599932487842512 in.	25.00
1 to 16 in. x 1/4903985410781699394247643899199864975685024 in.	25.00
1 to 16 in. x 1/9807970821563398788495287798399729951370048 in.	25.00
1 to 16 in. x 1/1961594164312679557699057597679459902670096 in.	25.00
1 to 16 in. x 1/3923188328625359115398115195358919805340192 in.	25.00
1 to 16 in. x 1/7846376657250718230796230390717839610680384 in.	25.00
1 to 16 in. x 1/15692753314501436461592460781435679221360768 in.	25.00
1 to 16 in. x 1/31385506629002872923184921562871358442721536 in.	25.00
1 to 16 in. x 1/62771013258005745846369843125742716885443072 in.	25.00
1 to 16 in. x 1/125542026516011491697397682501484337770886144 in.</	

EDWARD MILLER & CO.,

MERIDEN, CONN., Manufacturers of

Sheet Brass, Cast Brass, Brass Kettles, Machine Oilers, Lanterns,

KEROSENE LAMPS AND TRIMMINGS, TINMEN'S TRIMMINGS, &c.

Warehouse, - - 35 Warren Street, - - NEW YORK.

FRANCIS T. WITTE, | SUCCESSOR TO | KING, BRIGGS & CO., | 111 Chambers st., New York, | HARDWARE, CUTLERY & GUNS. | Net Cash. No Discount.



CASH BUYERS are invited to send for
ILLUSTRATED NET CASH PRICE LIST.

NO COMPLICATED DISCOUNTS.

Proprietor of "H. & J. W. KING'S" POCKET KNIVES, RAZORS AND SHEARS. Especial attention given to POCKET AND TABLE CUTLERY

AKRON IRON COMPANY,

AKRON, OHIO,

Sole Manufacturers of

Patent Hot Polished Shafting.

Medal of Superiority awarded at American Institute Fair of 1880.

This Shafting is superior to any in the market, and commends itself to the trade for the following reasons, viz:

- 1st. It is perfectly straight and round.
- 2d. It can be finished accurately to any desired gauge.
- 3d. It will not rust or tarnish easily.
- 4th. It will not warp or spring in key seating.
- 5th. Its surface is composed of magnetic oxide of iron, and consequently presents a journal or bearing surface that is unexcelled.
- 6th. The peculiarity of its manufacture is such as to entail loss in making it, if other than superior stock is used. Those purchasing it may therefore be assured of receiving first-class material.

Price lists, catalogues and references furnished on application.

Where parties desire it we cut keyways or splines any length required, at a moderate charge.

AKRON IRON CO., Akron, Ohio.

AGENTS:

E. P. BULLARD, 14 Dey Street, N. Y.
S. E. BLISS, 89 Lake Street, Chicago, Ill.
D. N. BROWN MACHINERY CO., St. Louis, Mo.
J. H. KERRICK & CO., Indianapolis, Ind.
JOSHUA HENDY, San Francisco, Cal.

TRENTON LOCK & HARDWARE CO.,

TRENTON, N. J.

MANUFACTURERS OF

DOOR LOCKS AND HARDWARE,

BRONZED IRON AND BRONZE METAL DOOR TRIMMINGS, BUTTS AND HARDWARE.

CAST BUTTS, DOOR BOLTS, WELL WHEELS, FLUSH BOLTS, SHUTTER BOLTS, PAD LOCKS, BARN DOOR HANGERS, & RAIL, GRINDSTONE FIXTURES, SCREW & SIDE PULLEYS, NOISELESS PULLEYS, HAY FORK PULLEYS, SHELF BRACKETS, PHILADELPHIA SLIDING DOOR HANGERS AND RAIL.

Having largely increased our facilities and line of goods, we invite the attention of the Trade.

Illustrated Catalogues Furnished on Application.

Agencies. { James M. Vance & Co., No. 211 Market St., Philadelphia.
James Marshall, No. 48 Warren St., New York.

THE STANLEY WORKS,

MANUFACTURERS OF

Wrought Iron Butts, Hinges

DOOR BOLTS,

Plain, Japanned, Bronzed and Plated.

FACTORIES:

WAREHOUSE:

New Britain, Connecticut. 79 Chambers St., New York.

Wilson Bohannon,

Manufacturer of Patent

BRASS PAD LOCKS

For Railroad Switches, Freight Cars, and the Hardware Trade. All sizes, with Brass and Steel Keys, with and without chains.

Patent Horizontal Rim Cylinder Night Latch.

Self-adjusting to doors of any thickness, with Patent Stop and Drawer Back Knob.

PASSENGER CAR LOCKS, Bronzed, Nickel-Plated and Japanned.

Catalogues and Samples sent on application.

BROOKLYN, N. Y.

SABIN MFG. CO.,

MONTPELIER, VT., MANUFACTURERS OF

DOUBLE-ACTING SPRING BUTTS,

SABIN'S LEVER DOOR SPRINGS, For heavy doors,

BOSS AND CROWN SPRINGS, For light doors,

Send for Catalogue. Represented in New York by DAVID HYMAN & CO., 99 Greenwich St.

GUN POWDER.

Laffin & Rand Powder Co.

No. 99 Murray Street, New York,

Manufacture and sell the following celebrated brands of Sporting Powder known everywhere as

ORANGE LIGHTNING,

ORANGE DUCKING,

ORANGE RIFLE

more popular than any Powder now in use.

Blasting Powder and Electrical Blasting Apparatus.

Military Powder on hand and made to order.

SAFETY FUSE, FRICTIONAL & PLATINUM FUSES.

Pamphlets showing sizes of grain sent free.

Mineral Wool.

Patented May 31, 1870.

A fibrous material, encasing about 90 per cent. of its volume of air, and therefore a superior

NON-CONDUCTOR

OF

HEAT AND SOUND.

Being made from the slag of blast furnaces, it is fire-proof and durable in contact with heated surfaces. Readily applied.

Heaviest grade about 25 lbs. per cubic foot. Price, 1 cent per lb.

U. S. MINERAL WOOL CO.,

16 Cortlandt St., New York.

KEYSTONE RIVETING FORGE.



An Improved Pattern.

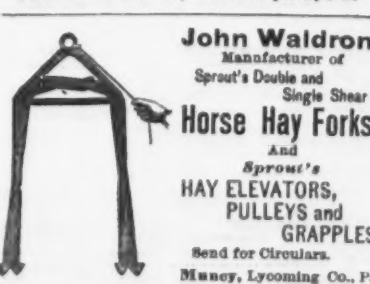
Cheap and Durable.

BEST IN THE MARKET.

Send for catalogue to

KEYSTONE PORTABLE FORGE CO.,

204 North 4th St., Philadelphia, Pa.



John Waldron,

Manufacturer of

Sprout's Double and Single Shear

Horse Hay Forks

And Sprout's

HAY ELEVATORS,

PULLEYS and GRAPPLERS.

Send for Circulars.

Milroy, Lycoming Co., Pa.

CORRUGATED AND CRIMPED IRON

ROOFING & SIDING,

Iron Buildings, Roofs

Shutters, Doors, Cornices

Skylights, Bridges, &c.

MOSELEY IRON BRIDGE AND ROOF CO.,

5 Dey Street, New York.

FOR SALE,

At New England Machinery Depot,

308 North Third St., Philadelphia, Pa.

Horizontal, Vertical and Locomotive Tubular

Boiler, from 3 to 60 H. P., in stock and larger to

order. Engines all sizes. Pumps, Heaters, Injec-

tors, steam and hand Brick and Mortar Hoists,

Boiler Test Pumps. The new Gravity Coffee

Roaster. All of the above constantly kept in stock.

Send for circular and price list.

STOVE REPAIRS.

Repairs for Stoves made at Troy, Albany, Ro-

chester, Cleveland, Buffalo, Boston, St. Louis,

Quincy, Chicago, Milwaukee and elsewhere, at

W. C. METZGER,

107 W. Randolph St., Chicago, Ill.

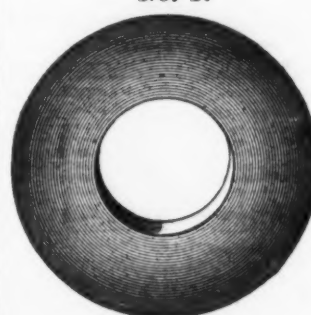
Providence Tool Co.,

PROVIDENCE, R. I.

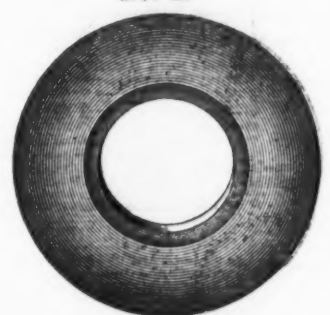
CLINCH RINGS.

No. 1.

No. 2.



Straight Hole.



Countersunk Hole.

Prices on Application.

HENRY B. NEWHALL, J. H. WORK, S. H. & E. Y. MOORE,

105 Chambers St.,

13 Pearl St.,

163 & 165 Lake St.,

NEW YORK AGENT.

BOSTON AGENT.

CHICAGO AGENT.

THE GENUINE STEBBINS

MOLASSES & OIL GATES,

MANUFACTURED ONLY BY

E. STEBBINS MFG. CO.

BRASS FOUNDERS AND FINISHERS.

Sole Manufacturers

Stebbins and Bright-

wood

COMPRESSION

AND

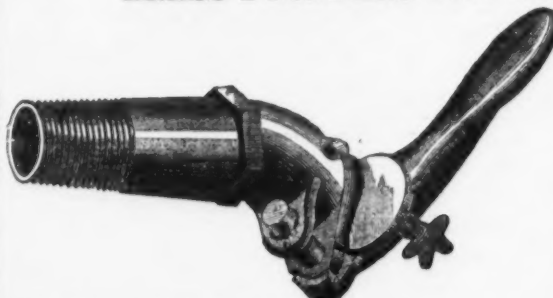
GROUND KEY WORK.

Send for circular and price

list.

H. M. BREWSTER, Agent

Brightwood P. O., Mass.



The Western trade can be supplied by

TREDWELL, COPPINS & CO., 130 Lake St., Chicago, Ill.

Office of NELSON LYON,

SOLE MANUFACTURER OF

Lyon's Patent Metallic

Heel Stiffeners,

Also, Manufacturer of

BRUSHES

Of Every Description,

Nos. 17 & 19 Green St.,

Albany, N. Y., Dec. 8, 1880.



To All Whom it May Concern:

To-day a decree in my suit against G. T. Fisher & Co., of Detroit, for an

infringement of my patent, was made and entered, of which the following is an extract:

At a session of the Circuit Court of the United States for the Eastern District of Michigan, held at Detroit,

Dec. 8, 1880, the 8th day of December, 1880. Present, Hon. H. B. Snows, District Judge.

NELSON LYON

vs.

GUYON T. FISHER, et al.

It is ordered, adjudged and decreed, that the act entitled "An act for the relief of Nelson Lyon and Jerome H. James," passed by Congress and approved April 3, 1880, &c., is a good, valid and constitutional act.

That the original patent, bearing date July 9, 1872, and numbered 138,441, granted and issued to Joseph Harsaloux, Jeremiah H. James and Nelson Lyon, when corrected by the Acting Commissioner of Patents, as directed by said act, was a good and valid patent.

That the said Joseph Harsaloux was the original and first inventor of the improvements in metallic stiffeners for boots and shoes mentioned and described in said letters patent.

That the said Nelson Lyon, by his attorneys, did, on or about the 1st day of May, 1880, procure and obtain from the Commissioner of Patents, an order for the issuance of a writ of injunction against the defendants, and also the costs, charges and disbursements in the action.

That said Lyon receive of said defendants all the profits, &c., they have made, and in addition thereto all the damage he has suffered by reason of the infringement by the defendants, and also the costs, charges and disbursements in the action.

It is also further ordered, adjudged and decreed, that a perpetual injunction be issued against said defendants, according to the prayer of the said complainant's bill.

You are also hereby notified that the perpetual injunction has been issued and served on the defendants.

All questions as to damages and settlements in relation to infringements under my

patents must be addressed to and made with my attorney, WILLIAM H. KING, in my care

at the above address.

NELSON LYON.

HARDWARE

[illegible]

[illegible]

BLOCK'S STRAINER
Office and Salesroom,
65 & 67 BAYARD STREET,
Factory, 139 & 141 Centre St., **NEW YORK.**

FOUNDRYMEN'S METALLIC
Pattern Letters and Figures,
To put on patterns of castings. All sizes. Re-
duced prices. Mfgd. by H. W. Knight
Schenectady, N.Y.

<p>SPECIALTIES. Enterprise Patent Cold Handle Double Pointed SMOOTHING & POLISHING IRONS CHAMPION TOBACCO CUTTERS, PATENT MEASURING FAUCETS, SELF-WEIGHING CHEESE KNIVES, &c., &c.</p>	<p>SPECIALTIES. AMERICAN COFFEE, SPICE & DRUG MILLS, SAUSAGE STUFFERS, FRUIT, LARD AND JELLY PRESSES, CHAMPION DRIED BEEF SHAVERS. Bang-Hole Borers, &c., &c.</p>
---	--

Steel.

WOLFF, KAHN & CO.,

MANUFACTURERS OF

Steel Wire

For All Purposes.

Special Finest CAST STEEL WIRE,
MARKET STEEL WIRE, PRIME COPPERED SPRING WIRE, TEMPERED AND
UNTEMPERED STEEL WIRES, IN LONG LENGTHS, FOR CRINOLINE, CORSET,
LOCK AND BRUSH MAKERS, AND ALL SPECIAL PURPOSES.

ALL KINDS OF FURNITURE SPRINGS.

IMPORTERS OF

IRON STEEL, & RAILS
OF EVERY DESCRIPTION.

WIRE RODS, PLAIN AND GALVANIZED WIRES, &c.,
GUN BARRELS, MOULDS, AND ORDNANCE.

Shipments in bond from American Ports and direct from Europe to all parts of the World.

EXPORTERS AND GENERAL MERCHANTS.

WORKS, PEEKSKILL, N. Y.

Direct all communications of the

OFFICE & WAREHOUSE, 93 John St., New York.

MILLER, METCALF & PARKIN,
Pittsburgh, Pa.,

Manufacturers of

CRESCENT STEEL,

In Bars, Sheets, Cold-Rolled Strips, &c.

Polished, Compressed Drill Rods and Wire.

Warranted equal to any imported in quality, finish and accuracy.

Also Common Grades.

Established 1810.

J. & RILEY CARR,
SHEFFIELD, ENGLAND.

Manufacturers of the "Celebrated

"DOG BRAND" FILES.

Also of Superior

STEEL

For Drills, Cold Chisels, Tools, Taps, Dies, &c.

COLD ROLLED STEEL for Clock Springs, Corsets, &c.
SHEET CAST STEEL for Springs, Saws, Welding and Stamping Cold, &c.
GERMAN, MACHINERY, ENGLISH AND SWEDISH SPRING STEEL,
And all other descriptions for machinists and agricultural purposes.

Warehouse, 30 Gold Street, New York.

Near John Street.

HENRY MOORE, Agent.

S. & C. WARDLOW,

Sheffield, England,

Manufacturers of the Celebrated

Cast and Double Shear
STEEL.

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table Knives,
Mining Tools, Dies, Files, Clock and other Springs, and Tools of every variety.

Warehouse, 95 John Street, New York.

WILLIAM BROWN, Representative.

Cleveland Rolling Mill Co.,

Manufacturers of

BESSEMER STEEL

AND

Iron Rail and Fastenings,

SPRING STEEL

AND

WIRE OF ALL KINDS,

Tire, Axles and other Forgings,

Roller Plate, Galvanized and Black Sheet Iron, Corrugated Roofing and
Siding of Siemens-Martin, Bessemer Steel and Iron.

CLEVELAND, OHIO.

Western Agency,

New England Agency,

91 Lake Street, Chicago.

239 Franklin Street, Boston.

N. D. PRATT, Agent.

JOHN WALES & CO., Agents.

THE MIDVALE STEEL CO.,

NICETOWN, PHILADELPHIA.

Best Warranted Cast Steel for Machinists' Tools,

Taps, Dies, Punches, Shear Blades, Chipping Chisels and Granite Rock Drills,

Extra Mild Center Steel, special for Taps,

ALSO,

MACHINERY AND CAST SPRING STEEL, HEAVY AND LIGHT FORGINGS.

Warehouse, No. 12 North 5th St., Philadelphia.

Address A. M. F. Watson, General Sales Agent.

STEEL Gautier Steel.

See Page 2.

Steel.

NEWARK STEEL WORKS.

BENJAMIN ATHA & CO.,

Manufacturers

BEST REFINED CAST STEEL

And grades of Steel specially adapted for Lathe Tools, Chisels and Taps and Dies.

Warranted most superior for TOOLS AND GRANITE ROCK DRILLS.

A full assortment of this universally approved OLD BRAND and other Steels for sale by

EDWARD FRITH & SON, Agents,

No. 241 Pearl St., New York.

LABELLE STEEL WORKS.

SMITH, SUTTON & CO.,

MANUFACTURERS OF ALL KINDS OF

STEEL.

Also Springs, Axles, Rake Teeth, &c.

OFFICE & WORKS, Ridge, Lighthill & Belmont Sts., & Ohio River, Allegheny,

Post Office Address, Pittsburgh, Pa.

Represented at Boston by WETHERELL BROS., at Oliver St.; at Philadelphia by JAMES C. HAND & CO.,

614 and 616 Market St.; at Cleveland by CONDIT, WICK & CO., 153 Water St.

ALBANY & RENSSLAER IRON & STEEL CO.,

Troy, N. Y.,

Office in New York City, 56 Broadway,

MANUFACTURERS OF

BESSEMER STEEL RAILS,

Machinery Steel, Merchant and Ship Iron.

HORSE SHOES.

SAM'L G. B. COOK & CO., Agents for Southern States,

67 and 69 German Street, Baltimore, Md.

FRANCIS HOBSON & SON

97 John Street, NEW YORK

Tele Manufact'rs of "CHOICE" Extra Cast Steel.

Manufacturers of all Descriptions of Steel.

Manufacturers of Every Kind of Steel Wire.

Don Works, Sheffield, England.

CHAS. HUGILL, Agent.

THE

STEEL COMPANY OF SCOTLAND, LIMITED

(SIEMENS' PROCESS.)

MANUFACTURERS OF

Steel Rails,

Steel Ship Plates.

Steel Blooms for Rails,

Steel Boiler Plates,

Steel Blooms for Wire,

Steel Angles,

Steel Wire Rods,

Steel Forgings,

Steel Locomotive Fire Boxes,

Steel Castings.

JAMES LEE & CO.,

Resident Agents for the United States,

72 Pine Street, New York.

GEO. SANDERSON & CO.,

MANUFACTURERS AND

Importers of STEEL,

Removed to 30 Gold Street, New York.

Particular attention is paid to quality and temper for FILES, SAWS, EDGE TOOLS,
TABLE and POCKET CUTLERY, TOOLS, TAPS and DIES; also for COLD ROLLED STEEL for
CLOCK SPRINGS, CORSET CLAMPS, &c.

A Large Assorted Stock of JOHN ROTHERY'S FILES always on hand.

Warranted Superior to any Steel in the Market, either English or American, for every purpose.

Also,

Combination Chrome Steel and Iron for

Safes, Jails and Deposit Vaults.

Send for Circular
and
Price List.

CHROME CAST STEEL.

Chrome Steel Works,

Kent Avenue and Keap Street,

BROOKLYN, E. D., N. Y.

Chicago Branch,

40 Dearborn Street,

Cincinnati Branch,

123 Central Avenue,

JOLIET STEEL COMPANY,

MANUFACTURERS OF

Steel Rails,

ALL WEIGHTS.

The Company Warrant its Rails equal in quality to any manufactured in the United States.

ALEX. J. LEITCH, President,

CHICAGO.

H. A. SMITH, General Sup't.

Office, Rooms D and E, Honore Building.

Works, Joliet, Ill.

Steel.

R. MUSHET'S
Special Steel

FOR

LATHES, PLANERS, &c.

Turns out at least double work by increased speed and less wear, and cuts harder metals than any other steel. Neither hardening nor tempering required.

Sole Makers,

SAMUEL OSBORN & CO.,

Sheffield, England.

Represented in the United States by

B. M. JONES & CO.,

Nos. 11 & 13 Oliver Street, BOSTON.

NAYLOR & CO.,

99 John St., New York.

6 Oliver St., Boston, Mass.

W. R. HART, Agent,

208 N. Fourth St., Philadelphia, Pa.

IMPORTERS OF

STEEL AND IRON RAILS,

Tin and Terne Plates,

Swedish and Norway Iron,

BESSEMER STEEL WIRE RODS,

Pig Iron, Spiegeleisen, Ferro-

man-ganese, Scrap Steel and Old

Iron Rails.

MANUFACTURERS OF

STEEL COMPRESSED SHAFTING,

"Benzon" Homogeneous Plates

For Boilers, Fire-boxes, &c.

Axles, Crank Pins, Spring Steel,

And all other kinds of

Martin-Siemens Steel and Iron

For Railroad purposes.

REYNOLDS, CARTER & REYNOLDS,

3 Clements Lane,

Lombard Street, LONDON, E. C.

Cable Address:

REYNOLDS,

London,

Iron and Steel Merchants

AND

ENGINEERS.

Exporters of

Iron and Steel Rails, Blooms, Spiegeleisen,

Pig Iron, Old Rails, Scrap Iron, Iron Ore,

and all kinds of Railway Plants,

Engines and Piping for Water-

works, Mining Machinery, &c.

JOHN H. WRIGHT,

Manufacturer of

MACHINISTS' TOOLS

FROM THE LATE

WOOD, LIGHT & CO.'S PATTERNS

Of Lathes and Planers.

Mr. Wright having formerly been a contractor
in building the same, will give superior work to all
who favor him with their orders.

Gear Cutting a Specialty.

237 Water Street,

BRIDGEPORT, CONN.

A. PARDEE, Hazelton, Pa. J. G. FELL, Phila.

A. PARDEE & CO.

237 South Third St.,

PHILADELPHIA,

No. 111 Broadway, New York.

MINERS AND SHIPPERS OF

Lehigh Coals.

The following superior and well-known Lehigh
Coals are mined by ourselves and firms connected
with us, viz.

A. Pardee & Co.

HAZLETON,
CRANBURY,
SUGAR LOAF.

Pardee, Bro. & Co.

LATTIMER.

Calvin Pardee & Co. HOLLYWOOD

Pardee, Sells & Co. MT. PLEASANT.

EMPIRE STATE MFG. CO.

BUFFALO, N. Y.

Copper,

Half Copper,

Nickel Plated

TEA KETTLES.

Metal Spinning.



Steel.

CARNEGIE BROS. & CO., LIMITED,
THOS. M. CARNEGIE, Chairman. PITTSBURGH, PA. D. A. STEWART, Treasurer.

EDGAR THOMSON STEEL WORKS DEPARTMENT.
Works at Bessemer Station, P. R. R.

Branch Office and P. O. Address, 48 Fifth Ave.,
MANUFACTURERS OF



OF SUPERIOR QUALITY.

Union Iron Mills Department

Mills at Thirty-third St. and A. V. R. R.

Branch Office and P. O. Address, Thirty-third St.

MANUFACTURERS OF

STRUCTURAL IRON.

Bridge Iron, Iron Beams, Channel Bars, Car Truck Channels, Angles, Tees, Universal Mill Plates, Bar Iron, Light Steel and Iron Rails.

Special attention given Unusual Shapes and Sizes.

Lithographs of sections and book of detailed information giving calculation of strain, &c., furnished to Engineers and Architects on application.

NEW YORK OFFICE: Room 32, No. 55 Broadway, N. Y.

NORTH CHICAGO ROLLING MILL CO.

ESTABLISHED 1857.

CAPITAL, \$3,000,000.

INCORPORATED 1866.

Works at Chicago, Ill., and Milwaukee, Wis.

MANUFACTURERS OF

MERCHANT BAR, FISH PLATES, PIG METAL, IRON RAILS & BESSEMER STEEL RAILS.

Present Annual Capacity of these Works:	Fish Plates.....	13,000 tons
	Merchant Bar.....	40,000 "
	Pig Metal.....	120,000 "
	Iron Rails.....	110,000 "
	Steel Rails.....	100,000 "
	Total Capacity per year.....	403,000 "

OFFICES

17 Metropolitan Block, Chicago, Ill.
37 Mitchell Block, Milwaukee, Wis.

O. W. POTTER, President, CHICAGO.
N. THAYER, Jr., Vice-President, Boston.
S. CLEMENT, Treasurer, MILWAUKEE.
R. C. HANNAH, Secretary, CHICAGO.

THE MONTGOMERY IRON & STEEL COMPANY,

WORKS AT DANVILLE, PA.

PIG IRON, T AND STREET RAILS.

A general assortment of mine and narrow gauge rails kept on hand, from which shipments can be made promptly.

W. E. C. COXE, President, Reading, Pa. F. P. HOWE, Gen'l Sup't, Danville, Pa. S. W. INGERSOLL, Treasurer, 227 South Fourth St., Philadelphia, Pa.

THE SIEMENS-ANDERSON STEEL CO.,

Successors to ANDERSON & CO.,

Manufacturers of

Crucible Tool, Cast Spring, Cast Plow, Iron Centre, Soft Centre, and Iron Back Plow, also Open Hearth

Spring, Tire, Plow, Machinery, and

ALL DESCRIPTIONS OF STEEL.

And Sole Proprietors of the Siemens Direct Process in the United States.

President, THOS. T. FLAGLER, of the Holly Manufacturing Co., Lockport, N. Y. Treasurer, L. M. LAWSON, of Donnell, Lawson & Simpson, New York. Asst. Treasurer, S. A. COSGRAVE, Pittsburgh, Pa. Secretary, C. G. HILBRETH, New York. Vice President and General Manager, ROBT. J. ANDERSON, Pittsburgh. Attorneys, Messrs. ARTHUR, KNEVALS & RANSOM, New York.

GUTE HOFFNUNG'S HUTTE,

(Works of Good Hope.)

Established 1781.

OBERHAUSEN, ON RUHR.

8500 men employed.

BRAND:

G. H. H.

STEEL RAILS, STEEL WIRE RODS,
STEEL BLOOMS, SPIEGELEISEN,
FERROMANGANESE UP TO 75 PER CENT.

GODEFFROY & CO., Sole Agents for the United States,
43 New Street, NEW YORK.

CHAMPION BARB WIRE.

Patented November 4, 1879, and fully licensed under all the bottom patents.



Send for circular and sample to

CRANDAL MFG. CO., 74 Michigan St., Chicago, Ill., or
HAZARD MFG. CO., No. 87 Liberty Street, New York.

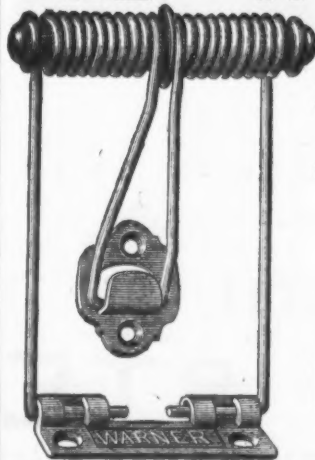
☞ A dealer wanted in every town.

BAEDER, ADAMSON & CO.,
Manufacturers of SAND & EMERY PAPER & EMERY CLOTH.

(Also in Rolls, for machine work.)

Ground Emery, Corundum & Flint, Glue & Curled Hair, Hair Felt, & Felt-
ing for Covering Boilers, Pipes, &c., Cow Hide Whips.
Stores: PHILADELPHIA, 730 Market St., BOSTON, 143 Milk St.
NEW YORK, 67 Beekman St. CHICAGO, 182 Lake St.

THE "WARNER" DOOR SPRINGS



are the most simple, most effective and most convenient ever introduced, and the immense sale we are having shows their great popularity and superiority.

There never was a Spring made that is so durable, so complete in its action, operating with a uniform pressure, holding the door tight when closed, and allowing it to open without increasing the pressure at any point.

When the door is opened about 130 degrees of a circle, it will press and hold it open.

The Spring is easily unhooked and rehooked—in an instant—from the door and also from the jamb, without removing a screw or pin.

This is a Convenience Possessed by no other Spring in the Market.

We are making this season three sizes, viz:

No. 1 For Screen or Light Storm Doors.

No. 2 For Medium Doors.

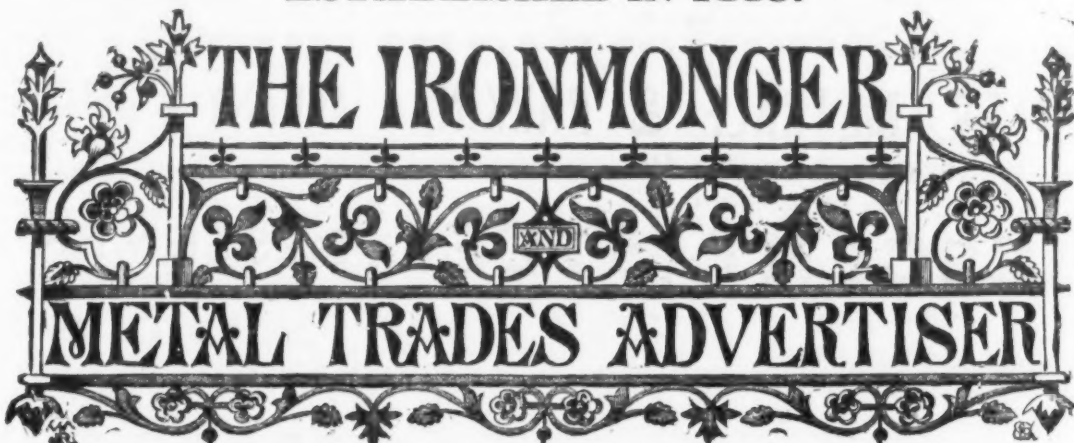
No. 3 For Heavy Doors.

They are for sale by most of the prominent jobbers of the United States and Canada.

Correspondence solicited.

FREDERIC BARTLETT,
FREEPORT, ILLINOIS.

ESTABLISHED IN 1859.



PUBLISHED EVERY SATURDAY.

THE OLDEST AND CHIEF REPRESENTATIVE OF THE IRON, HARDWARE AND METAL TRADES.

OFFICE: 44a CANNON STREET, LONDON, E. C.

ADVERTISEMENTS AND SUBSCRIPTIONS ARE RECEIVED AT THE VARIOUS OFFICES OF "THE IRON AGE," NAMELY:

NEW YORK OFFICE: DAVID WILLIAMS, Publisher of *The Iron Age*, 83 Reade street, who will, on receipt of application, supply specimen copies free.

PITTSBURGH OFFICE: 77 Fourth Avenue—JOS. D. WEEKS, Manager and Associate Editor.

PHILADELPHIA OFFICE: 222 South Fourth Street—THOMAS HOBSON, Manager.

CINCINNATI OFFICE: Builders' Exchange—T. T. MOORE, Manager.

SOUTHERN OFFICE: Cor. Eighth and Market Streets, Chattanooga, Tenn.—S. B. LOWE, Manager.

SPECIAL FEATURES.

Notes of Novelties.—This is a department of the journal always watched with interest by the trade, as it contains an account, from week to week, of the novelties which manufacturers and inventors are introducing to the notice of the trade. These articles are freely illustrated.

Special Correspondents.—The *Ironmonger* has a deserved reputation for its special correspondence from all the principal Continental, British and manufacturing centers. The writers are gentlemen holding important positions in the districts with which they are connected, and possess facilities for acquiring information specially suited for the columns of the *Ironmonger*. *The Week*, *Legal News*, *Trade Notes*, *Bankruptcies*, *Foreign Notes*, *Colonial Settings*, *Merchants' Circulars*, &c., are each departments of the journal, containing a digest of all matters of direct interest to the Iron, Hardware and Metal Trades. In addition to the above, there is a carefully classified list of Patents, together with Editorial Notes, French and Belgian and other Special Correspondence.

SUBSCRIPTIONS

To the *Ironmonger* and *Metal Trades Advertiser*, with which is sent every fourth week the Foreign Supplement (see below), may commence from any date, but are not received for less than a year. Advance payment is required for any part of the year outside Great Britain. To every subscriber is presented, free, in the course of his year, a handsome and useful *Ironmongers' Diary and Text Book*, a work sold to non-subscribers at 75 cents.

ADVERTISEMENTS

are inserted in the *Ironmonger* and *Metal Trades Advertiser* at the subjoined rates, from which no variation can be made on any ground whatever.

Size of Page—Nine Inches Deep by Six Inches Wide.

One Advertisement of every Series of 13 Monthly, 27 Fortnightly, or 53 Weekly, will be inserted in the *Ironmongers' Diary and Text Book*, published toward the end of each year, and presented to every Subscriber.

	53 INSERTIONS, each net.	27 INSERTIONS, each net.	13 INSERTIONS, each net.	7 INSERTIONS, each net.	3 INSERTIONS, each net.	1 INSERTION, net.
One page.....	Gold. \$20.00	Gold. \$22.50	Gold. \$25.00	Gold. \$30.00	Gold. \$35.00	Gold. \$50.00
Two-thirds page.....	15.00	16.90	18.75	22.50	26.25	37.50
Half page.....	11.00	12.40	13.75	16.50	19.25	27.50
One-third page.....	8.00	9.00	10.00	12.00	14.00	22.00
Quarter page.....	6.40	7.25	8.00	9.60	11.20	16.00
One-sixth page.....	4.50	5.10	5.65	6.75	7.75	11.30
One-eighth page.....	3.60	4.10	4.50	5.40	6.25	9.00
One-sixteenth page.....	2.00	2.25	2.50	3.00	3.50	5.00

SPECIAL ISSUES.

In the spring and autumn of each year there is published a Special Issue, the circulation of which is not less than Twelve Thousand (12,000) copies.

THE IRONMONGERS' DIARY AND TEXT BOOK.

This is an annual presented free to every Subscriber to the *IRONMONGER AND METAL TRADES ADVERTISER*. It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to year. It is handsomely bound in cloth, gilt, and as copies are used in thousands of establishments for a whole year, it is obviously a medium of exceptional value for advertisements. Sold to non-subscribers at 75 cents.

THE FOREIGN SUPPLEMENT,

With which is incorporated The Universal Engineer.

Is published every fourth week in connection with the extensive and world-wide circulation of the *Ironmonger* itself. The dates of its publication for the next twelve months will be as follows:

OCTOBER 6, NOVEMBER 6, DECEMBER 3 and 31, 1881; JANUARY 20, FEBRUARY 25, MARCH 25, APRIL 22, MAY 20, JUNE 17, JULY 8, AUGUST 5, and SEPTEMBER 2, 1882.

This Supplement is published in

FOUR LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the *Ironmonger* not only within reach but in the native language of eighty millions of German, forty-two millions of French, twenty-eight millions of Italian, and fifty-one millions of Spanish speaking people; or, in all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to be found.

Advertisements are inserted in any language at the following

MODERATE TARIFF.

Size of Page—13½ Inches Deep by 9½ Inches Wide.

	13 INSERTIONS, each net.	7 INSERTIONS, each net.	3 INSERTIONS, each net.	13 INSERTIONS, each net.	7 INSERTIONS, each net.	3 INSERTIONS, each net.
One page.....	Gold. \$30.00	Gold. \$33.75	Gold. \$37.50	Gold. \$10.00	Gold. \$11.25	Gold. \$12.50
Two-thirds page.....	22.00	24.75	27.50	7.50	8.45	9.40
Half page.....	17.00	19.15	21.25	6.20	7.00	7.75
One-third page.....	12.50	14.10	15.65	3.20	3.40	4.00

Advertisers will do well to use illustrations freely. Where economy of space is an object, a left page illustrated &c. described in one language can be suitably described in four or more languages on the opposite or right page without illustrating.

THE WHOLE FOREIGN HARDWARE TRADE

so far as our experience of twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or advertisement inserted in the *Ironmonger* and *Foreign Supplement* is a strikingly powerful and most efficient way of publicizing it to be compared with any of the other ordinary channels of communication.

B. KREISCHER & SONS, FIRE BRICK.

BEST AND CHEAPEST.
Established 1845.
Office, foot of Houston Street, East River,
NEW YORK.

NEWTON & CO.,

ALBANY, N. Y., Manufacturers of

FIRE BRICK

Stove Linings,
Range and Heater Linings

Cylinder Brick, &c., &c.
For Glass and Steel Works.

SILICA,

Bricks and Cement,
English Fire Bricks.
RIMINGTON BROS. & CO.,
Newcastle-on-Tyne.

Agent on this side
S. A. RIMINGTON,
264 & 266 Water Street,
NEW YORK.

M. D. Valentine & Bro
Manufacturers of

FIRE BRICK
And Furnace Blocks
DRAIN PIPE & LAND TILE.
Woodbridge. - - - N. J.

BORGNER & O'BRIEN,

Manufacturers

FIRE BRICK

Edge Pressed Furnace Blocks,
CLAY RETORTS, TILES, &c.,
Twenty-third Street,
PHILADELPHIA.
Above Race.
Twenty years' practical Experience.

WATSON FIRE BRICK CO.,

ESTABLISHED 1846.

Successors to JOHN R. WATSON, Perth Amboy, New Jersey.
Manufacturers of

FIRE BRICK,

FOR ROLLING MILLS, BLAST FURNACES, FOUN-
DRIES, GAS WORKS, LIME KILNS, TANNERIES,
BOILER and GRATE SETTING, GLASS WORKS, &c.
Fire Clays, Fire Sand, and Kaolin for Sale.

HENRY MAURER,

Proprietor of the

Excelsior Fire Brick & Clay
Retort Works,
Manufacturer of FIRE BRICK, HOLLOW
BRICK and CLAY RETORTS.

WORKS: PERTH AMBOY, NEW JERSEY.
Office & Depot: 418 to 422 East 23d St., N. Y.

TROY FIRE BRICK WORKS,

Troy, N. Y.,

JAMES OSTRANDER & SON,

ESTABLISHED 1848.

Manufacturers of

FIRE BRICK,

Tiles, Gas Works, Blast Furnace Bricks, &c., Miners and
foundry 1 & 2 Woodbridge Fire Clay and Sand, and Staten
Island and Kaolin.

Established 1864.

GARDNER BROTHERS,

Manufacturers of

STANDARD SAVAGE FIRE BRICK,
TILE & FURNACE BLOCKS,
OF ALL SHAPES AND SIZES.

Clay Gas Retorts and Retort Settings, and
Miners and Shippers of Fire Clay.
OFFICE: 116 Smithfield St., Pittsburgh, Pa.
WORKS: Mt. Savage Junction, Md., and Lockport, Pa.

HALL & SONS,

FIRE BRICK,
Buffalo, N. Y.

CHAS. D. COLSON,

FIRE BRICK,
Foundry Facings, Sand, Tools and Supplies.
CHICAGO, ILL.

UNION MINING COMPANY,

Mount Savage Fire Brick.
EDWARD J. ETING, Agent,
No. 230 South Third St., Philadelphia, Pa.

THOMAS MORTON,

Manufacturer of
CABLE, COPPER, IRON AND STEEL SASH CHAINS.
of expanding window sashes. Also Copper Cham-
fered Clauses, with patent attachments, for same pur-
pose. Agents wanted in the principal cities in the
United States. Apply at
65 Elizabeth Street, New York.

HENRY DISSTON & SONS,

KEYSTONE SAW, TOOL, STEEL & FILE WORKS,

Front and Laurel Streets,

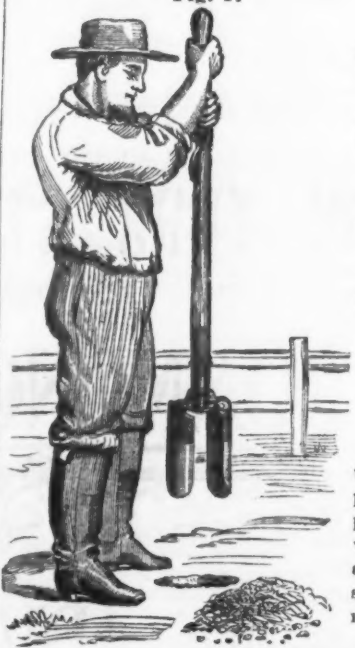
PHILADELPHIA.

DISSTON'S SAMSON TREE PLANTER AND POST HOLE DIGGER.

Fig. 1.

Patented May 29, 1870.

Fig. 2.



Price, - - - \$37.50 per dozen.

No Farmer, Nurseryman, Railroad
or Telegraph Company
SHOULD BE WITHOUT ONE.

NO BACK-ACHE.

NO KNEE-WORK.

NO CLOGGING.

This tool has been thoroughly tested, and has given
the greatest satisfaction to all who have tried it. The
principle on which it works makes it self-cleaning and
prevents adhesion in sticky soil; therefore it always
works free and easy. It is far superior to all plungers,
augers and boring machines, as it works well in stony,
sandy, or clay soils; quicksand under water is as easily
removed as though no water existed.

DIRECTIONS.

Plunge the Digger into the ground, as shown in cut, Fig. 1, and when the soil is loosened pull out the lever with one hand, as shown in cut, Fig. 2, which will press the dirt between the blades; then draw the Digger from the hole, keeping hold of the lever with one hand and the handle with the other. When the Digger is clear of the hole, you can deposit the load anywhere within reach by simply pressing down the lever, which will open the blades and the dirt will fall from between them. The Digger is then ready for another plunge. The steel blades are nine inches long, and the whole tool five feet long. For sale at Hardware and Agricultural Stores.

HENRY DISSTON & SONS.

STANDARD SHAFT COUPLING SPRING.

CHICAGO, ILL.,
July 21, '81.

Gentlemen:
You may enter
our order for
500 sets of your
Standard Shaft
Coupling Springs
(60 sets a month).
A. A. ABBOTT
& CO.

Side View.
One dozen pairs, Japanese
expressed to the responsible
Hardware or Carriage
trades for \$1.50 per gross.
\$15.4 mos. note, 5 per cent.
off 30 days, 10 off spot cash.
Discount to jobbers. Splen-
did selling article for com-
mercial travelers. (Nickel
plated springs \$3 per doz.
pairs. Dealers and the
trade also supplied by the
E. D. Clapp Mfg. Co., An-
dover, N. Y., and Wilcox &
Howe, Birmingham, Conn.;
Crandall, Stone & Co.,
Mfrs. Carriage Trimmings,
Binghamton, N. Y.
Perfect Anti-Rattler and Shaft Bolt Locker, and loose
nest on a bumper. Sold by all hardware dealers every-
where. Orders, large or small, filled promptly.

Front View.
A. G. MOREY & CO., 90 Randolph Street,
(McCormick Block), CHICAGO,
Manufacturers for U. S. & Canada, under Letters
Patent.



WM. L. DAVIS, Chelsea, Mass.,
Manufacturer of

WINDOW WEIGHTS,
Sole Manufacturer of

Park's Patent Folding Lunch Box.



Curtis Pressure Regulator.
Is made entirely of metal; occupies the same space
as a globe valve. It has no glands or packing, and is
a lock-up valve. Write for circular. Manufactured by
CURTIS REGULATOR CO.,
59 Beverly Street, BOSTON, MASS.



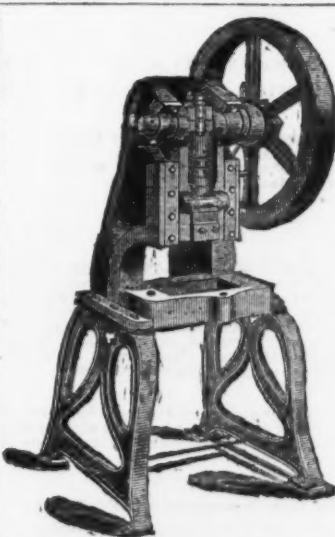
HOWARD IRON WORKS,
BUFFALO, N. Y.,
Manufacturers of

BOLT CUTTERS
AND NUT TAPPING MACHINES,
(Schlenker's Patent.)
Send for Illustrated Catalogue.

STEEL STAMPS STENCIL PAINT
BRASS RUBBER STAMPING INK &c.
A. M. MICHAEL, ALBANY, N.Y.

Brass Molders and Manufacturers
write for sample and price of Fine Red Brass
Molding Sand.

W. J. CHAPMAN, Baltimore, Md.



ROCKING BLOCK GRATE,

Williams' Patent,

J. Q. MAYNARD,
General Agent.

97 Liberty Street, NEW YORK.

Fire level. Accumulation of cinders impossible.
No cleaning out of fires during the day. Parts
easily and cheaply replaced. Seventy per cent.
of air space. Thirty days' trial.
Send for circular.

GREEN'S PURE SILICA FIRE BRICK,

MADE BY

LAGLEDE FIRE BRICK MANUFACTURING CO.,

SPECIALLY ADAPTED FOR

Pernot and Siemens Open Hearth
Steel Furnaces and for Glass Furnaces.
Office, 901 Pine St., St. Louis, Mo.

REMOVAL.

Please notice that we have removed from No. 295 THIRD AVENUE to
No. 37 Warren Street, near Church St.,
Where we hope to be favored with a continuance of your generous patronage.

J. M. FARRINGTON & CO.,

Successors to DAY, FARRINGTON & CO., Manufacturers of

LOCKS, KNOBS, GONGS, BLANK KEYS,
Wrought Store Door and Flush Bolts, Silver Plated, Ornamental Bronze and other Hardware.

JOHN SOMMER'S SON, 8, 10 & 12 Pearl St., Newark, N. J.,
Manufacturer of every description

WOODEN FAUCETS.
Cork lined, first quality, warranted. Metallic Key,
Lignumvite Key, Rosewood, Red Cedar, Cherry and
Butternut Faucets.
John Sommer's Metallic Key and First Quality Cor-
lined Faucets are the best. Send for catalogue.

JOHN SOMMER'S BEST METALLIC KEY.

DAVID HYMES & CO.,

92 Church Street, New York,

JOB LOTS OF HARDWARE & CUTLERY.

John T. Lewis & Bros.

No. 231 South Front St.,
PHILADELPHIA.



TRADE MARK.

MANUFACTURERS OF

Pure White Lead, Red Lead, Litharge,
Orange Mineral, Linseed Oil,
AND PAINTERS' COLORS.

Brooklyn White Lead Co.



TRADE MARK

White Lead, Red Lead & Litharge.
No. 182 Front Street,
NEW YORK.

JOHN JEWETT & SONS,

Manufacturers of the well-known brand of

WHITE LEAD.

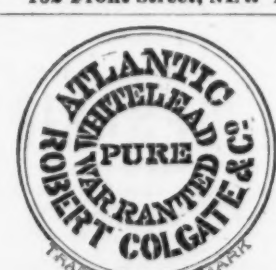


TRADE MARK

ALSO MANUFACTURERS OF

LINSEED OIL.

192 Front Street, NEW YORK.

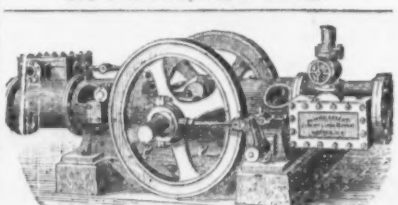


The Atlantic White Lead and
Linseed Oil Co.,
Manufacturers of

White Lead (Atlantic), Red Lead, Lith-
arge, Glass Makers' Litharge and
Orange Mineral;

LINSEED OIL,
Raw, Refined and Boiled.

ROBERT COLGATE & CO.,
287 Pearl St., NEW YORK.



AIR COMPRESSORS.

ALLEN'S

HIGH SPEED AIR COMPRESSORS,
With Positive Moving Valves.

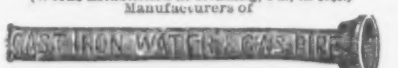
Allen Engines, Stationary and Marine Boilers,
Hoisting Machinery. Also, Patent Evaporators
and Condensers for Animal Matters.

AIR COMPRESSORS A SPECIALTY.

JOHN McLAREN,
River Street, - - - HOBOKEN, N. J.

Mellert Foundry & Machine Co.,

Limited,
(Works Established at Reading, Pa., in 1842.)
Manufacturers of



Specialty: Range Pipe, Rotors, Valves and Hydrants,
Lamp Posts, &c. The Improved Canadian Tur-
bine Water Wheel, Machinery and Castings
for Furnaces, Rolling Mills, Grist and Saw Mills, Min-
ing Pumps, Hoists, &c. Columns, Brackets, Iron
Railings, &c. Offices:
Second and Chestnut Sts., Reading, Pa., and
74 Pine Street, New York City.

PHILADELPHIA.

Corrected Weekly by Lloyd, Supple & Watson.
 terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Anvils.
 Peter Wrights, # B. 1000
 Over 250 lbs. 110
 Eagle (American). 100 # B. 110

Apple Parers.
 Penn Apple Parer 85.50
 Rotary Peach Parer 15.50
 Lots of 10 to 25 dozen special prices.

Axes.
 Hunt's Kentucky and Yankee, per doz \$9.00 @ 10.00
 Mann's Red Warrior. 9.00 @ 9.50
 Richmond Chief. 9.00 @ 9.50
 Beveled Axes. add 50c
 Double Bit Axes. 10.00

Augers and Auger Bits.—New List January 1.
 Baker's Nut Auger. 1000
 Cook's Auger. 1000
 Watson's Ship Auger. 1000
 Benjamin Pierce Auger Bits. 1000
 Griswold Auger Bits. 1000
 Cook's. 1000
 Jennings. 1000
 Bonny's Pat. Hol. Augers, list \$18.00 doz. 1000
 Spang's Pat. Hol. Augers, list \$18.00 doz. 1000

Balances.
 Light and Common. 1000

Bells.
 Bevin Bros. Mfg. Co. Light Hand Bells. 1000
 Bells Pattern Hand Bells. 1000
 Connell's Door Bells. 1000
 G. & W. Western & Kentucky Cow, new list. 1000

Belts and Rivet Clippers.
 Chambers No. 1. for 1/2 doz. 1000
 No. 2. 1000
 No. 3. 1000

Sewing Machines.
 Upright, without Augers. 1000
 Angular, without Augers. 1000

Bolts.—Eastern Carriage Bolts. 1000
 Philadelphia. 1000
 Stanley, Wrought Shutter. 1000

Braces.—Barber's. 1000
 Backus. 1000
 Scofield. 1000
 American Ball. 1000

Butts.—Cast Fast Joint, Narrow. 1000
 Broad. 1000
 Cast Loose Joint, Narrow. 1000
 Broad. 1000

Cast Loose Joint, Narrow. 1000
 Broad. 1000
 Acorn, Loose Joint. 1000
 Mayer's Loose Joint. 1000

Wrought Loose Joint. 1000
 Table Hinges and Back Flaps. 1000
 Narrow, Flat. 1000
 Loose Joint. 1000

Blind Butts. 1000
 Parker. 1000
 Clark. 1000
 Rhead. 1000
 Lull & Porter. 1000
 Huffer. 1000

Chains.—German Halter and Coll. new list Oct. 22. 1000
 Galvanized Pump. 1000
 Best Proof Coll Chain. 1000

Chisels.—Socket Framing. 1000
 Rocket Framer. 1000
 Butcher's. 1000
 Flat. 1000

Coffers.—Bed (new list July 1, 1880). 1000
 Flat. 1000

Coffee Mills.—Box and Side, new list Jan. 1. 1000
 Enterprise. 1000

Cutlery.—Walden Pocket. 1000
 Landers, Fry & Clark, J. Russell & Co. Lamsom. 1000
 Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices not.

Drawing Knives. 1000
 Hart Mfg. Co. 1000
 Adjustable Handle. 1000

Fry Pans. 1000
 No. 1. 1000
 No. 2. 1000
 No. 3. 1000
 No. 4. 1000
 No. 5. 1000
 No. 6. 1000
 No. 7. 1000
 No. 8. 1000
 No. 9. 1000
 No. 10. 1000

Files. 1000
 Nicholson. 1000
 Diston. 1000
 Butcher. 1000
 Sawyer. 1000
 E. M. Boynton, new list. 1000

Fluting Machines. 1000
 Eagle. 1000
 Crown. 1000
 No. 1. 1000
 No. 2. 1000
 No. 3. 1000
 No. 4. 1000
 No. 5. 1000
 No. 6. 1000
 No. 7. 1000
 No. 8. 1000
 No. 9. 1000
 No. 10. 1000

Geneva Fluter. 1000
 Favorite com. Fluter & Sad Iron. 1000

Hammers. 1000
 Verkes & Plumb's, new list. 1000

Bands. 1000
 Boynton's Pat. Saw Handles. 1000

Hatchets. 1000
 Verkes & Plumb, new list. 1000
 Hunt. 1000

Hinges. 1000
 Strap and T. 1000

Horse Nails. 1000
 Ausable. 1000
 Blue and Polished. 1000
 Globe. 1000
 Clinton. 1000
 Porter, all sizes. 1000
 Discount on Ausable and Clinton, 30 & 150c, 100c

Locks and Knobs. 1000
 Bradford. 1000
 American Padlocks. 1000
 Scandinavian Padlocks. 1000
 No. 1. 1000
 No. 2. 1000
 No. 3. 1000
 No. 4. 1000
 No. 5. 1000
 No. 6. 1000
 No. 7. 1000
 No. 8. 1000
 No. 9. 1000
 No. 10. 1000

Lanterns. 1000
 Nall City. 1000
 Square Candle and Oil. 1000
 Tubular. 1000
 Globe, 30 cts. No. 1, \$1.00; No. 2, \$1.00; No. 3, \$1.00; No. 4, \$1.00; No. 5, \$1.00; No. 6, \$1.00; No. 7, \$1.00; No. 8, \$1.00; No. 9, \$1.00; No. 10, \$1.00

Lawn Mowers.—Pennsylvania. 1000
 Philadelphia. 1000
 Excelsior. 1000

Lawn and Garden Pumps. 1000
 Holland Patent. 1000

Mattresses. 1000
 Long and Short Cut. 1000
 Pennsylvania Pattern. 1000

Melange Gas. 1000
 Enterprise Mfg. Co.'s Measuring Faucets. 1000
 Stebbins' Gates. 1000
 Lincoln. 1000
 Landers, Fry & Clark's Petroleum. 1000
 Brass Liquor Cocks, new list Jan. 1. 1000
 Cock Lined. 1000

Meat Cutters.—Pennsylvania. 1000
 Dixon's. 1000
 Woodruff. 1000
 Howe. 1000
 Hale's. 1000
 American. 1000
 Butcher. 1000
 Enterprise. 1000

Planes.—Ohio Tool Co. 1000
 Auburn. 1000
 New York Tool Co. 1000
 Bailey. 1000

Plane Irons.—Ohio Tool Co. 1000
 Butcher's. 1000
 Plumb and Leve. 1000
 Stanley's Adjustable. 1000
 Non-adjustable. 1000

Picks.—New List. 1000
 Pumps. 1000
 Stanley. 1000
 Stanley Boxwood. 1000
 Stanley Ivory. 1000

Steele's.—Hart's Pattern. 1000
 No. 1. 1000
 No. 2. 1000
 No. 3. 1000
 No. 4. 1000
 No. 5. 1000
 No. 6. 1000
 No. 7. 1000
 No. 8. 1000
 No. 9. 1000
 No. 10. 1000

Squares. 1000
 Steel and Iron. 1000
 Try Squares. 1000
 Diston's Try Squares. 1000

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened. 1000
 Clipper No. 5. Painesville. 1000
 Sharpened. 1000

Sinew.—Diston's Hand, Panel and Rip. 1000
 Diston's Circular. 1000
 Cross-Cut No. 2. Plain Tooth. 1000
 Patent Tooth. 1000

Boynton's Lightning Cross Cut, new list. 1000
 One Man, all lengths. 1000
 Biller. 1000
 Lightning Buck Saws, cross bar. 1000
 Hand, Panel and Rip. 1000

Shovels and Spades. 1000
 Oliver Ames & Sons, new list. 1000
 Griffiths. 1000
 Rowland. 1000

Sud Irons.—to 10 lbs. 1000
 Vers. Potter Patent. 1000
 Sequence. 1000
 Washita Extra. 1000
 No. 1. 1000
 No. 2. 1000
 No. 3. 1000
 No. 4. 1000
 No. 5. 1000
 No. 6. 1000
 No. 7. 1000
 No. 8. 1000
 No. 9. 1000
 No. 10. 1000

Turkey Oil Stone No. 1. 1000
 Ax Stone. 1000

Washita Extra. 1000
 No. 1. 1000
 No. 2. 1000
 No. 3. 1000
 No. 4. 1000
 No. 5. 1000
 No. 6. 1000
 No. 7. 1000
 No. 8. 1000
 No. 9. 1000
 No. 10. 1000

Screws. 1000
 Flat Head Iron. 1000
 Brass. 1000
 Round Head Iron. 1000
 Iron. 1000

Spoons. 1000
 Plated. 1000
 German Silver. 1000
 Britannia, Boardman. 1000
 Parker's. 1000

Tinned. 1000
 Sprague. 1000
 Philadelphia. 1000
 Chatfield No. 1. 1000
 Gem Coal No. 1. Large Jap'd. 1000
 No. 2. Medium Jap'd. 1000
 No. 3. Small Jap'd. 1000

Sticks and Dies. 1000
 Stove Polish. 1000
 Dixon. 1000
 Onyx. 1000
 Tacks. 1000
 Shoe Nails. 1000
 Double Pointed Tacks. 1000

Traps. 1000
 Genuine Onelida-Newhouse. 1000
 Im. Onelida-Newhouse list, first qual. 1000
 Vices. 1000
 Wrenches. 1000
 Copes. 1000
 Mechanics. 1000
 Mail. 1000
 Philada. Tool Co., Duplex. 1000

Wire. 1000
 Bright or Ann'd. No. 6 to 18. 1000
 No. 19 to 26. 1000
 No. 27 to 36. 1000
 Coppered. 1000
 Tinned Broom Wire. 1000
 Galvanized No. 7 to 18. 1000
 Fearless No. 24. 1000
 Universal. 1000
 Novelty. 1000

PITTSBURGH.

Merchant Iron.
 TERMS.—Note or acceptance at 60 days, with current rate of exchange on New York, or a discount of 2 per cent. for cash, if remitted within 10 days from date of invoice.

For fluctuations and discounts on card rates see weekly Pittsburgh Trade Report.

The following are card rates.

Flat Bar.
 1 1/2 by 3/4 by 10 ft. 1000
 1 1/2 by 3/4 by 12 ft. 1000
 1 1/2 by 3/4 by 14 ft. 1000
 1 1/2 by 3/4 by 16 ft. 1000
 1 1/2 by 3/4 by 18 ft. 1000
 1 1/2 by 3/4 by 20 ft. 1000
 1 1/2 by 3/4 by 22 ft. 1000
 1 1/2 by 3/4 by 24 ft. 1000
 1 1/2 by 3/4 by 26 ft. 1000
 1 1/2 by 3/4 by 28 ft. 1000
 1 1/2 by 3/4 by 30 ft. 1000
 1 1/2 by 3/4 by 32 ft. 1000
 1 1/2 by 3/4 by 34 ft. 1000
 1 1/2 by 3/4 by 36 ft. 1000
 1 1/2 by 3/4 by 38 ft. 1000
 1 1/2 by 3/4 by 40 ft. 1000
 1 1/2 by 3/4 by 42 ft. 1000
 1 1/2 by 3/4 by 44 ft. 1000
 1 1/2 by 3/4 by 46 ft. 1000
 1 1/2 by 3/4 by 48 ft. 1000
 1 1/2 by 3/4 by 50 ft. 1000
 1 1/2 by 3/4 by 52 ft. 1000
 1 1/2 by 3/4 by 54 ft. 1000
 1 1/2 by 3/4 by 56 ft. 1000
 1 1/2 by 3/4 by 58 ft. 1000
 1 1/2 by 3/4 by 60 ft. 1000
 1 1/2 by 3/4 by 62 ft. 1000
 1 1/2 by 3/4 by 64 ft. 1000
 1 1/2 by 3/4 by 66 ft. 1000
 1 1/2 by 3/4 by 68 ft. 1000
 1 1/2 by 3/4 by 70 ft. 1000
 1 1/2 by 3/4 by 72 ft. 1000
 1 1/2 by 3/4 by 74 ft. 1000
 1 1/2 by 3/4 by 76 ft. 1000
 1 1/2 by 3/4 by 78 ft. 1000
 1 1/2 by 3/4 by 80 ft. 1000
 1 1/2 by 3/4 by 82 ft. 1000
 1 1/2 by 3/4 by 84 ft. 1000
 1 1/2 by 3/4 by 86 ft. 1000
 1 1/2 by 3/4 by 88 ft. 1000
 1 1/2 by 3/4 by 90 ft. 1000
 1 1/2 by 3/4 by 92 ft. 1000
 1 1/2 by 3/4 by 94 ft. 1000
 1 1/2 by 3/4 by 96 ft. 1000
 1 1/2 by 3/4 by 98 ft. 1000
 1 1/2 by 3/4 by 100 ft. 1000

Rounds and Squares.
 1 1/2 by 3/4 by 10 ft. 1000
 1 1/2 by 3/4 by 12 ft. 1000
 1 1/2 by 3/4 by 14 ft. 1000
 1 1/2 by 3/4 by 16 ft. 1000
 1 1/2 by 3/4 by 18 ft. 1000
 1 1/2 by 3/4 by 20 ft. 1000
 1 1/2 by 3/4 by 22 ft. 1000
 1 1/2 by 3/4 by 24 ft. 1000
 1 1/2 by 3/4 by 26 ft. 1000
 1 1/2 by 3/4 by 28 ft. 1000
 1 1/2 by 3/4 by 30 ft. 1000
 1 1/2 by 3/4 by 32 ft. 1000
 1 1/2 by 3/4 by 34 ft. 1000
 1 1/2 by 3/4 by 36 ft. 1000
 1 1/2 by 3/4 by 38 ft. 1000
 1 1/2 by 3/4 by 40 ft. 1000
 1 1/2 by 3/4 by 42 ft. 1000
 1 1/2 by 3/4 by 44 ft. 1000
 1 1/2 by 3/4 by 46 ft. 1000
 1 1/2 by 3/4 by 48 ft. 1000
 1 1/2 by 3/4 by 50 ft. 1000
 1 1/2 by 3/4 by 52 ft. 1000
 1 1/2 by 3/4 by 54 ft. 1000
 1 1/2 by 3/4 by 56 ft. 1000
 1 1/2 by 3/4 by 58 ft. 1000
 1 1/2 by 3/4 by 60 ft. 1000
 1 1/2 by 3/4 by 62 ft. 1000
 1 1/2 by 3/4 by 64 ft. 1000
 1 1/2 by 3/4 by 66 ft. 1000
 1 1/2 by 3/4 by 68 ft. 1000
 1 1/2 by 3/4 by 70 ft. 1000
 1 1/2 by 3/4 by 72 ft. 1000
 1 1/2 by 3/4 by 74 ft. 1000
 1 1/2 by 3/4 by 76 ft. 1000
 1 1/2 by 3/4 by 78 ft. 1000
 1 1/2 by 3/4 by 80 ft. 1000
 1 1/2 by 3/4 by 82 ft. 1000
 1 1/2 by 3/4 by 84 ft. 1000
 1 1/2 by 3/4 by 86 ft. 1000
 1 1/2 by 3/4 by 88 ft. 1000
 1 1/2 by 3/4 by 90 ft. 1000
 1 1/2 by 3/4 by 92 ft. 1000
 1 1/2 by 3/4 by 94 ft. 1000
 1 1/2 by 3/4 by 96 ft. 1000
 1 1/2 by 3/4 by 98 ft. 1000
 1 1/2 by 3/4 by 100 ft. 1000

Half Oval and Half Round.
 1 1/2 by 3/4 by 10 ft. 1000
 1 1/2 by 3/4 by 12 ft. 1000
 1 1/2 by 3/4 by 14 ft. 1000
 1 1/2 by 3/4 by 16 ft. 1000
 1 1/2 by 3/4 by 18 ft. 1000
 1 1/2 by 3/4 by 20 ft. 1000
 1 1/2 by 3/4 by 22 ft. 1000
 1 1/2 by 3/4 by 24 ft. 1000
 1 1/2 by 3/4 by 26 ft. 1000
 1 1/2 by 3/4 by 28 ft. 1000
 1 1/2 by 3/4 by 30 ft. 1000
 1 1/2 by 3/4 by 32 ft. 1000
 1 1/2 by 3/4 by 34 ft. 1000
 1 1/2 by 3/4 by 36 ft. 1000
 1 1/2 by 3/4 by 38 ft. 1000
 1 1/2 by 3/4 by 40 ft. 1000
 1 1/2 by 3/4 by 42 ft. 1000
 1 1/2 by 3/4 by 44 ft. 1000
 1 1/2 by 3/4 by 46 ft. 1000
 1 1/2 by 3/4 by 48 ft. 1000
 1 1/2 by 3/4 by 50 ft. 1000
 1 1/2 by 3/4 by 52 ft. 1000
 1 1/2 by 3/4 by 54 ft. 1000
 1 1/2 by 3/4 by 56 ft. 1000
 1 1/2 by 3/4 by 58 ft. 1000
 1 1/2 by 3/4 by 60 ft. 1000
 1 1/2 by 3/4 by 62 ft. 1000
 1 1/2 by 3/4 by 64 ft. 1000
 1 1/2 by 3/4 by 66 ft. 1000
 1 1/2 by 3/4 by 68 ft. 1000
 1 1/2 by 3/4 by 70 ft. 1000
 1 1/2 by 3/4 by 72 ft. 1000
 1 1/2 by 3/4 by 74 ft. 1000
 1 1/2 by 3/4 by 76 ft. 1000
 1 1/2 by 3/4 by 78 ft. 1000
 1 1/2 by 3/4 by 80 ft. 1000
 1 1/2 by 3/4 by 82 ft. 1000
 1 1/2 by 3/4 by 84 ft. 1000
 1 1/2 by 3/4 by 86 ft. 1000
 1 1/2 by 3/4 by 88 ft. 1000
 1 1/2 by 3/4 by 90 ft. 1000
 1 1/2 by 3/4 by 92 ft. 1000
 1 1/2 by 3/4 by 94 ft. 1000
 1 1/2 by 3/4 by 96 ft. 1000
 1 1/2 by 3/4 by 98 ft. 1000
 1 1/2 by 3/4 by 100 ft. 1000

Hoop Iron.
 1 1/2 by 3/4 by 10 ft. 1000
 1 1/2 by 3/4 by 12 ft. 1000
 1 1/2 by 3/4 by 14 ft. 1000
 1 1/2 by 3/4 by 16 ft. 1000
 1 1/2 by 3/4 by 18 ft. 1000
 1 1/2 by 3/4 by 20 ft. 1000
 1 1/2 by 3/4 by 22 ft. 1000
 1 1/2 by 3/4 by 24 ft. 1000
 1 1/2 by 3/4 by 26 ft. 1000
 1 1/2 by 3/4 by 28 ft. 1000
 1 1/2 by 3/4 by 30 ft. 1000
 1 1/2 by 3/4 by 32 ft. 1000
 1 1/2 by 3/4 by 34 ft. 1000
 1 1/2 by 3/4 by 36 ft. 1000
 1 1/2 by 3/4 by 38 ft. 1000
 1 1/2 by 3/4 by 40 ft. 1000
 1 1/2 by 3/4 by 42 ft. 1000
 1 1/2 by 3/4 by 44 ft. 1000
 1 1/2 by 3/4 by 46 ft. 1000
 1 1/2 by 3/4 by 48 ft. 1000
 1 1/2 by 3/4 by 50 ft. 1000
 1 1/2 by 3/4 by 52 ft. 1000
 1 1/2 by 3/4 by 54 ft. 1000
 1 1/2 by 3/4 by 56 ft. 1000
 1 1/2 by 3/4 by 58 ft. 1000
 1 1/2 by 3/4 by 60 ft. 1000
 1 1/2 by 3/4 by 62 ft. 1000
 1 1/2 by 3/4 by 64 ft. 1000
 1 1/2 by 3/4 by 66 ft. 1000
 1 1/2 by 3/4 by 68 ft. 1000
 1 1/2 by 3/4 by 70 ft. 1000
 1 1/2 by 3/4 by 72 ft. 1000
 1 1/2 by 3/4 by 74 ft. 1000
 1 1/2 by 3/4 by 76 ft. 1000
 1 1/2 by 3/4 by 78 ft. 1000
 1 1/2 by 3/4 by 80 ft. 1000
 1 1/2 by 3/4 by 82 ft. 1000
 1 1/2 by 3/4 by 84 ft. 1000
 1 1/2 by 3/4 by 86 ft. 1000
 1 1/2 by 3/4 by 88 ft. 1000
 1 1/2 by 3/4 by 90 ft. 1000
 1 1/2 by 3/4 by 92 ft. 1000
 1 1/2 by 3/4 by 94 ft. 1000
 1 1/2 by 3/4 by 96 ft. 1000
 1 1/2 by 3/4 by 98 ft. 1000
 1 1/2 by 3/4 by 100 ft. 1000

Light Bars.
 1 1/2 by 3/4 by 10 ft. 1000
 1 1/2 by 3/4 by 12 ft. 1000
 1 1/2 by 3/4 by 14 ft. 1000
 1 1/2 by 3/4 by 16 ft. 1000
 1 1/2 by 3/4 by 18 ft. 1000
 1 1/2 by 3/4 by 20 ft. 1000
 1 1/2 by 3/4 by 22 ft. 1000
 1 1/2 by 3/4 by 24 ft. 1000
 1 1/2 by 3/4 by 26 ft. 1000
 1 1/2 by 3/4 by 28 ft. 1000
 1 1/2 by 3/4 by 30 ft. 1000
 1 1/2 by 3/4 by 32 ft. 1000
 1 1/2 by 3/4 by 34 ft. 1000
 1 1/2 by 3/4 by 36 ft. 1000
 1 1/2 by 3/4 by 38 ft. 1000
 1 1/2 by 3/4 by 40 ft. 1000
 1 1/2 by 3/4 by 42 ft. 1000
 1 1/2 by 3/4 by 44 ft. 1000
 1 1/2 by 3/4 by 46 ft. 1000
 1 1/2 by 3/4 by 48 ft. 1000
 1 1/2 by 3/4 by 50 ft. 1000
 1 1/2 by 3/4 by 52 ft. 1000
 1 1/2 by 3/4 by 54 ft. 1000
 1 1/2 by 3/4 by 56 ft. 1000
 1 1/2 by 3/4 by 58 ft. 1000
 1 1/2 by 3/4 by 60 ft. 1000
 1 1/2 by 3/4 by 62 ft. 1000
 1 1/2 by 3/4 by 64 ft. 1000
 1 1/2 by 3/4 by 66 ft. 100

L.M. RUMSEY MFG. CO.
MANUFACTURERS & JOBBERS OF
PUMPS & IRON WORKING MACHINERY,



LEAD PIPE & SHEET LEAD
PLUMBERS & STEAM FITTERS
BRASS GOODS
BARBED WIRE FENCING
RAILWAY SUPPLIES
N 804 TO B 20 N. SECOND ST.
ST. LOUIS, MO.

GAS PIPE & FITTINGS
BELTING
HOSE
PACKING
PUMP
CHAIN & C.

AMERICAN BOLT CO., Lowell, Mass.,
MANUFACTURERS OF
Bolts, Nuts, Washers, Chain Links, Car
Bolts, Bridge Bolts, Lag Screws, &c.

JACK SCREWS,
Press Screws, &c.,

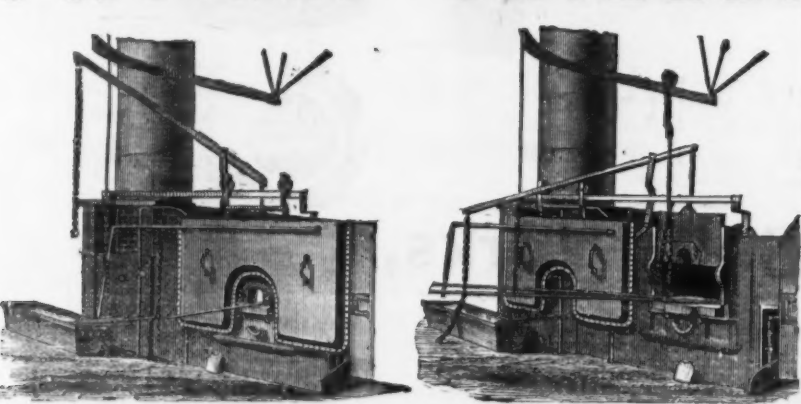
Cast with Perfect Seamless Thread by our New
Patent Process.

Cheaper than Wrought Iron, not so apt to
Bend or Strip the Thread.

LIBERAL DISCOUNT TO THE TRADE.

SEECER MFG. CO., Box 1513, Springfield Mass.
H. E. ASHCRAFT, Agt., 12 Murray St., & 15 Park Place, New York.

MCDONALD'S
PATENT SHIELD.
Martin's Celebrated
RED JACKET
Adjustable Force Pumps.



For Protecting the Men from Heat when Working in Front of
Puddling, Heating and other Furnaces.

H. McDONALD, Patentee,
MANAGER SLIGO ROLLING MILLS,
PITTSBURGH, PA.

RIPLEY & KIMBALL,
Nos. 907, 909 & 911 N. Main St., ST. LOUIS.
IRON & STEEL BOILER PLATES & SHEETS.
Brass and Iron Fittings for Steam.
Lap-Welded Pipe & Boiler Tubes
RAILWAY AND BOILER MAKERS' SUPPLIES.

AGENCY NATIONAL TUBE WORKS CO.
H. H. COLES & CO.,
446 North Twelfth Street, PHILADELPHIA.

NEW CHUCKING DRILL REST.
It will hold all sizes of drills up to 1 1/4 inches.
Price 60 Cents.

COXE BROS. & CO.,
Cross Creek Lehigh Coal.

The Purity and Strength of this Coal especially adapt it for the working
of Iron and Metals.
GENERAL OFFICE, Room 12 Trinity Building, 111 Broadway, New York.
BRANCH OFFICES, Chicago, Ill., 54 Dearborn Street.
Philadelphia, 205 Walnut Place.
Boston, 26 Exchange Place.
E. B. & S. W. ELY, Agents, P. O. Box 262, N. Y.

J. F. WOLLENSAK'S

PATENT

Transom
Lifter
and Lock.

For all kinds
of Transoms,
Fanlights and
Skylights.

Send for catalogue
and price list.

J. F. WOLLENSAK,
Patentee and Sole Manufacturer,
CHICAGO, ILL.

THE DUPLEX INJECTOR.

The Best Boiler Feeder

Known.

Unequalled for simplicity and easy adjustment for varying pressures of steam. Will start when the injector is hot. Less liable to get out of order than a pump. Always delivers water hot to the boiler.

Manufactured and for Sale by

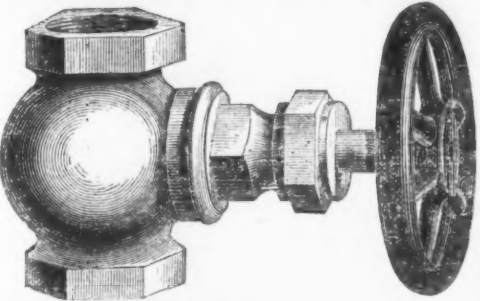
JAMES JENKS,
16 & 18 Atwater St., East,
DETROIT, MICH.

BOSTON.

Reported by Macomber, Bigelow & Dwyer.
Anvil.—"Eagle American"..... \$ 2 50c. dis 20 5
Anvil & Vise..... \$ 2 50c. dis 20 5
No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

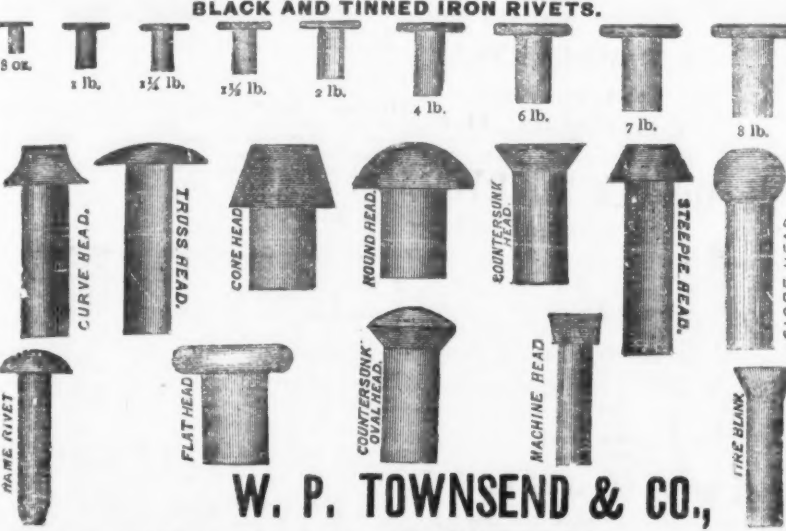
McNab & Harlin Mfg. Co.,
MANUFACTURERS OF

BRASS COCKS AND VALVES,
For STEAM,
WATER
and GAS.
**WROUGHT IRON
PIPE AND FITTINGS,
PLUMBERS' MATERIALS**



Factory, Paterson, N. J. 56 John Street, N. Y.

BLACK AND TINNED IRON RIVETS.



W. P. TOWNSEND & CO.,
PITTSBURGH, PA.,
Manufacturers of every description of First Quality
RIVETS.

HENRY B. NEWHALL,
105 Chambers St.,
New York Agent.




WM. H. HASKELL & CO.,
Pawtucket, R. I.
MANUFACTURERS OF

COACH SCREWS,
(With Gimlet Points),
ALL KINDS OF

Machine and Plow Bolts,
AND
TAP BOLTS.

HENRY B. NEWHALL,
105 Chambers St.,
New York Agent.

STANDARD NUT CO.,
Pittsburgh, Pa.,
MANUFACTURERS OF



**HOT PRESSED
Square & Hexagon Nuts,**
**R. R. FISH BARS,
BOLTS,
SPIKES,
RIVETS, &c.**

HENRY B. NEWHALL,
105 Chambers St.,
New York Agent.

Philadelphia "STAR" Bolt Works.
NORWAY IRON FANCY HEAD BOLTS,
Carriage & Tire Bolts. Star Axle Clips, &c.
TOWNSEND, WILSON & HUBBARD, 2301 Cherry Street, Philadelphia, Pa

MACHINE, PATCH AND STAY BOLTS.
HOOPES & TOWNSEND,
**KEYSTONE
BOILER RIVETS**
PHILADELPHIA.

W. ASHERS
Cold Punched.
WOOD SCREWS, TANK RIVETS, FLAT LINK CHAIN.

SIDNEY SHEPARD & CO.,
PROPRIETORS OF
THE BUFFALO STAMPING WORKS.



MANUFACTURERS OF
STAMPED & JAPANNED TIN WARE
Retinned Ware, Plain Piced Tin Ware, Bathing Apparatus, Toilet Ware, Tin Toys,
Spoons, Forks, Cake Turners, Coal and Fire Shovels, Pokers, Fry
Pans, Stove Skillets, Coal Hods, Coal Vases, Water Coolers
and Filters, Harness Oil Cans, Soldering Coppers.
Dripping Pans, Elbows, Milk Cans and Fixtures, Roofing Nails, Stove Boards,
Transportation Cans, Buffalo Champion Ice Cream Freezers.
PERFORATED SHEET IRON FOR PAPER MANUFACTURERS AND MALT KILNS.
Grocers', Druggists' and Spice Mills' Tin Ware a Specialty.
Also, A LARGE LINE OF MISCELLANEOUS HOUSE FURNISHING HARDWARE.
Send for Illustrated Catalogue. Address

SIDNEY SHEPARD & CO.,
Buffalo, N. Y., or Chicago, Ill.

NORWAY IRON CARRIAGE & TIRE BOLTS.
Axle Clips, &c.



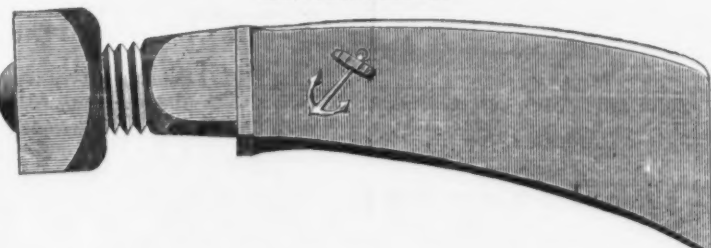
COLEMAN EAGLE BOLT WORKS,
WELSH & LEA, Philadelphia, Pa.

F. M. HASLETT & CO.,
MANUFACTURERS OF



Carriage, Machine and Skein Bolts, Lag Screws, &c.
ALLEGHENY, PA.
W. K. ROSS, J. A. FULLER, W. K. FULLER, Sole Agents,
97 Chambers Street, New York.

Columbus Bolt Works,
COLUMBUS, OHIO.
MANUFACTURERS OF



Threshing Machine Teeth
For all the Leading Machines.
GENUINE NORWAY IRON CARRIAGE BOLTS.
Illustrated Catalogues and Prices mailed on application.

W. C. WREN'S PATENT GRATE BAR.



DAVID S. CRESWELL, Manufacturer,
816 Race Street, PHILADELPHIA, PA.
The most durable Grate Bar on the market. Send for circular and price list.

PHILADELPHIA SCREW CO., Limited,
Twelfth and Buttonwood Streets, PHILADELPHIA.
Manufacturers of

IRON & BRASS WOOD SCREWS.



Quality, finish and tests as to strength guaranteed equal to any in the market.
With improved facilities and largely increased capacity for production, we can fill orders promptly, and invite inquiries for discounts. A full line in stock.

P. BLAISDELL & CO.,
Manufacturers of



MACHINISTS' TOOLS,
Blaisdell's Patent Upright Drills,
With Quick Return Motion.
Engine Lathes, Planers, Boring Mills,
Gear Cutters and Hand Lathes.
WORCESTER, MASS., U. S. A.



Quick Adjustable Tire Bender.
The best and cheapest arrangement for bending tires in the market. Simple in construction, adjustable to any size or diameter tire.
No. 1 bends any tire up to 4 1/2 in. wide.....Price, \$10.00
No. 2 bends any tire up to 6 in. wide.....Price, \$12.00



IMPROVED AUTOMATIC TIRE AND AXLE SETTER.
The most perfect machine for upsetting or shrinking wagon tires, axles, braces, &c., ever placed in the market. Every blacksmith should have one. They are cheaper than any other machine, and one man operates it alone. Liberal discount to the trade and agents. Send for circulars and discount. Correspondence with jobbers solicited.
No. 1 upsets any tire up to 3 in. wide x 5 1/2 in. Price, \$10.00
No. 2 upsets any tire up to 4 in. wide x 5 1/2 in. Price, \$12.00
For sale by RUSSELL & ERWIN MFG. CO., 45 Chambers St., New York, and E. C. THOMBLEY & CO., Pittsburgh, N. Y. (P. O. Box 310), Sole and Proprietors.

**HILDEBRAND
SELF-MEASURING
PUMP AND TANK.**
Economical, saves all the oil, reduces insurance. The best arrangement extant. Can be used in barrel as readily as in tank. No measure or funnel used.
THE YOUNGSTOWN MEASURING PUMP CO.
Sole Manufacturers,
YOUNGSTOWN, O.
Every Pump guaranteed to be just what we claim for it.
25¢ For further information address company, as above.



John McLean,
Manufacturer of
Ayres' Hydrants,
Stop Cocks & Galvanized Cemetery Supplies.
256 & 300 Monroe St., N. Y.

**HOLT
PORTABLE FORGES**
Manufactured by
HOLT MFG. CO.
Cleveland, Ohio.
New York Warehouses
79 & 81 Beade St.
F. PORTER THAYER,
Manager.

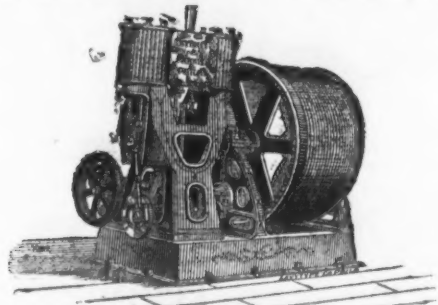



PITTSBURGH MFG. CO.
Manufacturers of Nail and Spike Machines, Bolts, Nuts, Washers, Rivets, &c. Castings, Forgings and Blacksmith Work promptly attended to.
OFFICE & WORKS, Railroad St. near 28th., Pittsburgh, Pa.



CUYAHOGA FALLS, O.
**Tinned Belt Rivets and
Burrs a specialty.**

VERTICAL ENGINE



IRON FURNACE HOIST.

The above cut represents our Vertical Iron Furnace Hoisting Engine, having double cylinders, fitted with our improved reversing valves, automatic stop and brake.

Prices furnished on application for engine alone or for complete outfit.

Patterns on hand for various sizes.

STOKES & PARRISH, 3001 Chestnut St., Philadelphia.

\$\$\$ **SAVED** \$\$\$

1977 NINETEEN HUNDRED SEVENTY-SEVEN 1977
MACHINES

BOTH NEW AND SECOND-HAND

COMPRISING
MACHINE AND BLACKSMITH
TOOLS OF EVERY DESCRIPTION.
WOOD-WORKING MACHINERY IN ALL ITS
BRANCHES. PORTABLE ENGINES. UPRIGHT and HOR-
ZONTAL STATIONARY ENGINES. LOCOMOTIVE FIRE-
BOX, HORIZONTAL, and UPRIGHT BOIL-
ERS, 1 TO 100 HORSE POWER. WATER WHEELS, COT-
TON AND WOOLLEN MACHINERY, STEAM
PUMPS, CRISTMILL MACHINERY,
Etc., FULLY DESCRIBED, AND
PRICES ANNEXED.

Send stamp for same.

In our List No. 23.

[stating what you want.]

We have the Largest Assortment of Machinery to be found in the hands of any firm in the country.

Works and Main Office,
Manchester, N. H.

S. C. FORSAITH & CO.

Branch Office and Wareroom, 209 Center street, New York City.

DUPLIX SAFETY BOILER.

Unequalled Economy.

Positive circulation, insuring under all circumstances a clean boiler. No sediment. The best materials. No joints, but expanded joints in combustion chamber.

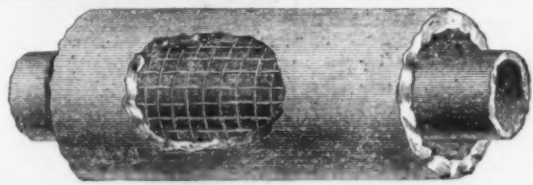
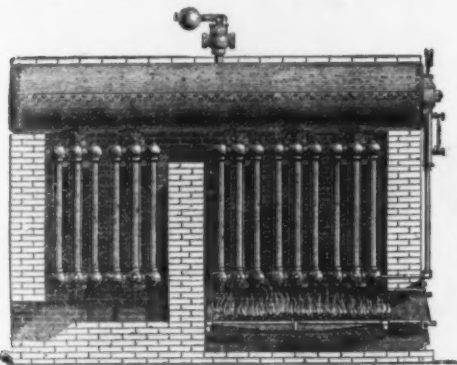
The most durable boiler made. Send for circular.

DUPLIX SAFETY BOILER CO.,

34 Cortlandt Street,

NEW YORK.

Chicago Office,
45 Franklin Street.



The Patent "Air Space" Coverings for Steam Pipes, Hot-Blast Pipes, Boilers, &c.

The Patent Felt and Asbestos Non-conducting Removable Covering.

THE NATIONAL STEEL TUBE CLEANER.

Asbestos Materials, Fiber, Millboard, Packing and Cement.

THE CHALMERS-SPENCE CO., Foot East 9th St., 10 Cortlandt St., N. Y.

ADAM HEINZ.

GEO. J. MUNSCHAUER.

MICHAEL J. STARK

NIAGARA STAMPING & TOOL CO.,

Manufacturers of

Presses, Dies and Tools

For Working Sheet Metal.

Fruit Can and Tinner's Tools, &c.

Works, 147 and 149 Elm Street,

Near Clinton st., **BUFFALO, N. Y.**



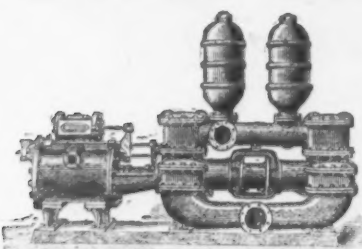
KEYSTONE STEAM PUMP WORKS,

PUMPS

AND
PUMPING MACHINERY

Of all Kinds.

THOMPSON, EPPING & CARPENTER,
PITTSBURGH, PA.



THORNE, DeHAVEN & CO., Drilling Machines,

21st Street, above Market, Philadelphia.

PORTABLE DRILLS. Driven by power in any direction.

RADIAL DRILLS. Self-feed—Large Adjustable Box Table.

VERTICAL DRILLS. Self-feeding.

MULTIPLE DRILLS. 2 to 20 Spindles.

HORIZONTAL BORING AND DRILLING MACHINES.

HAND DRILLS. CAR BOX DRILLS.

SPECIAL DRILLS. For Special Work.

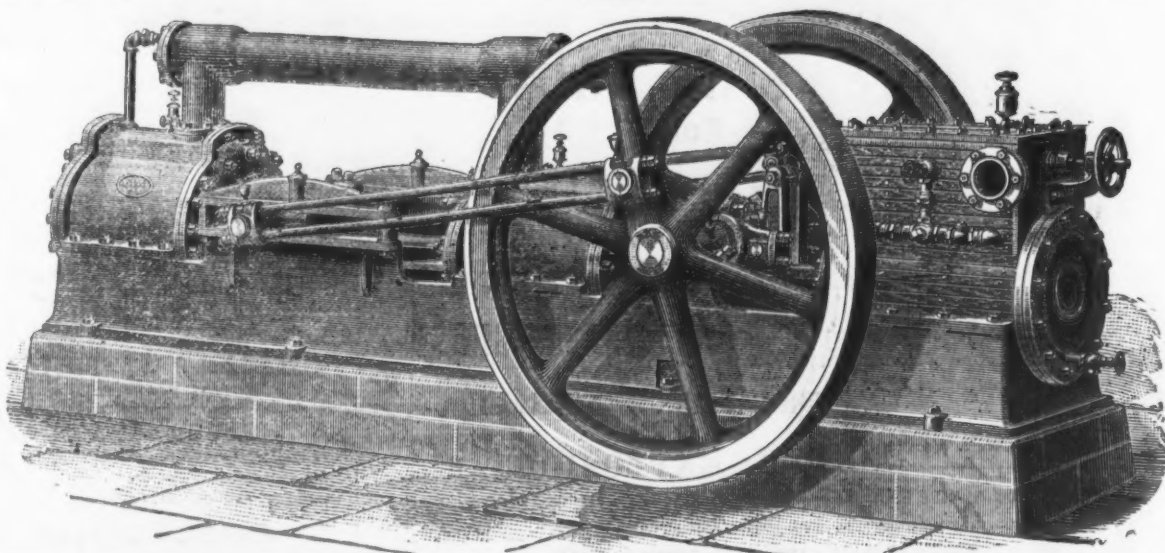
CHAINS.

S. WOODHOUSE, Newburg, Ohio,

Hand-made COIL, CABLE AND BLOCK CHAINS.

Send for prices.

Air Compressors.



THE NORWALK IRON WORKS CO., South Norwalk, Conn.

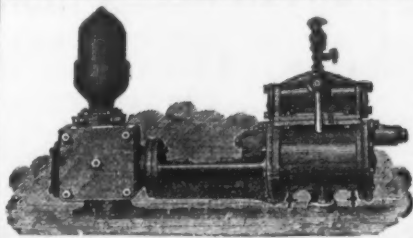
A. S. CAMERON'S

PATENT

"SPECIAL" STEAM PUMP

Is the Standard of Excellence at Home and Abroad

For reduced price lists address **A. S. CAMERON, East 23d Street, New York.**



E. W. Bliss, BLISS & WILLIAMS,

MANUFACTURERS OF ALL KINDS OF

PRESSES

Also Manufacturers of
SPECIAL MACHINERY

FOR
WORKING SHEET
METALS, &c.
FRUIT & other
CAN TOOLS.



GOLD MEDAL AWARDED



Plymouth, Pearl and
John Streets,

BROOKLYN, N. Y.,

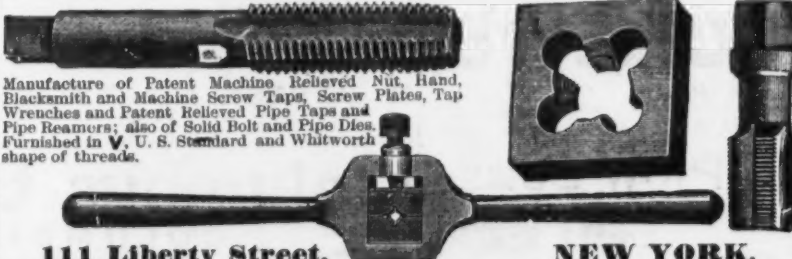
U. S. A.



PARIS EXPOSITION, 1878.

MANNING, MAXWELL & MOORE,

Sole Sales Agents for **THE MORSE TWIST DRILL AND MACHINE CO.'S**



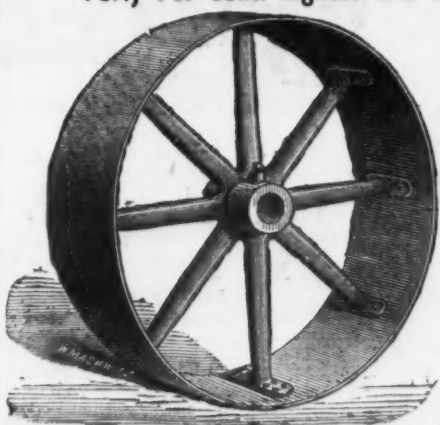
Manufacture of Patent Machine Relieved Nut, Hand, Blacksmith and Machine Screw Taps, Screw Plates, Tap Wrenches and Patent Relieved Pipe Taps and Pipe Reamers; also of Solid Bolt and Pipe Dies. Furnished in U. S. Standard and Whitworth shape of threads.

111 Liberty Street,

NEW YORK.

THE MEDART PATENT WROUGHT RIM PULLEY.

Forty Per Cent. Lighter and 100 Per Cent. Stronger



than any cast pulley. No shrinkage strains; perfectly balanced for high speeds; better surface for belt, and

The Cheapest Pulley in the Market.

We make these Pulleys from 10 inches to 10 feet diameter, any face, crowning or straight, split or whole, single or double arms.

Large Pulleys a Specialty.

Send for price list.

The Hartford Engineering Co.,

HARTFORD, CONN.

Sole licensed manufacturers for the New England, Middle and Atlantic Coast States.



Ludlow Valve Mfg. Co.,

OFFICE AND WORKS:

938 to 954 River St. & 67 to 83 Vail Ave., Troy, N. Y.

VALVES.

Double and Single Gate, 1/4 in. to 48 in.—outside and inside Screws, Indicator, &c. for Gas, Water and Steam. Send for Circular.

Also FIRE HYDRANTS.



WICKERSHAM & CO.,

MANUFACTURERS OF

Railway, Miners', Mill & Machinists' Supplies

W. & Co.'s Packing: Steam, Hydraulic and Locomotive. Samples sent free.

Lubricants for Engines, Shafting, &c.; Rolling Mill, Railroad, Gear and Axle Grease.

Also, Star Cylinder Oils.

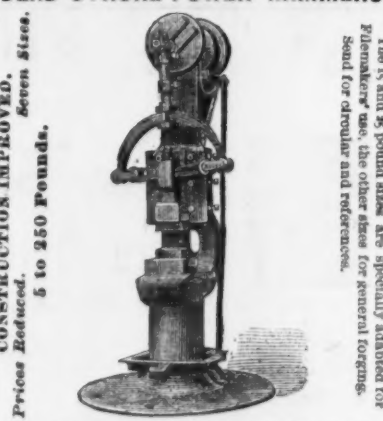
Samples sent free for trial upon application.

No. 309 Race Street, Philadelphia, Pa.

COCHRANE & CO., Agents, 93 Fourth Ave., Pittsburgh.



DEAD-STROKE POWER HAMMERS.



DIENELT, EISENHARDT & CO.

MAKERS.

1310 Howard St., Philadelphia.

The Twiss Patent Automatic Cut-off Engine

Is first class in every respect.

The valve gear is of the disengaging type, is exceedingly simple, accessible and durable.

Cylinders with this cut-off can be placed on any engine now in use at moderate expense, and will save from 30 to 50 per cent. in fuel over the plain slide valve and throttle governor. Also, Vertical, and Yacht Engines. **NELSON W. TWISS,**

25 Whitney Ave., New Haven, Conn.

CRANE BROTHERS MAN'G. CO.,

CHICAGO.

MANUFACTURERS OF

WROUGHT IRON PIPE,

STEAM PUMPS,

STEAM and GAS FITTINGS.

Steam and Hydraulic

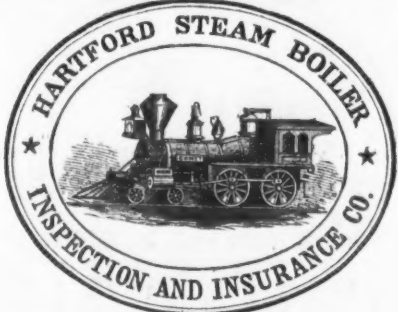
Freight and Passenger Elevators

STEAM HOISTING ENGINES

for Furnaces, Mines, &c.

Stationary Steam Engines &c

Machinery, &c.



Issues Policies of Insurance after a careful inspection of the Boilers

COVERING ALL LOSS OR DAMAGE TO

Boilers, Buildings and Machinery.

ARISING FROM

STEAM BOILER EXPLOSIONS.

The Business of the Company includes all kinds of STEAM BOILERS.

Full information concerning the plan of the Company's operations can be obtained at the

COMPANY'S OFFICE, HARTFORD, CONN.,

or at any Agency.

J. M. ALLEN, Pres. W. B. FRANKLIN, Vice-Pres. J. B. PIERCE, Sec.

Board of Directors:

J. M. ALLEN, President.
LUCIUS J. HENDEE, Pres't Aetna Fire Ins. Co.
HANK W. CHENEY, Asst. Treas. Cheney Brothers Silk Manufacturing Co.
CHARLES M. BEACH, of Beach & Co.
DANIEL PHILLIPS, of Adams Express Co.
GEO. M. BATHOLMEW, Pres't Amer. Nat'l Bank.
RICHARD W. H. JARVIS, Pres't Colt's Fire Arms Manufacturing Co.
THOMAS O. ENDARS, Sec'y Aetna Life Ins. Co.
LEVERETT BRINARD, of Case, Lockwood & Brainard.

GEN. WM. B. FRANKLIN, Vice Pres't Colt's Pat. Fire Arms Mfg. Co.
GEO. CROMPTON, Crompton Loom Works, Worcester
WILLIAM ADAMSON, of Baeder, Adamson & Co., Philadelphia
HON. THOS. TALBOT, Ex-Governor of Mass.
NEWTON CASE, Case, Lockwood & Brainard, Hartford
WILLIAM & SLATER, Cotton Manufacturer, Providence, R. I.
NELSON HOLLISTER, of State Bank, Hartford.
D. R. SMITH, Pres't Springfield Fire & Marine Ins. Co.

LYON'S HAND OR POWER PUNCHES AND SHEARS.

For Round, Flat or Square Iron,

Polishing & Buffing Machinery,

HYDRAULIC JACKS,

To raise from 2 to 120 tons.

HYDRAULIC PRESSES,

For special and general use.

HYDRAULIC HAND & POWER PUMPS

with 1 to 6 plungers, to run hydraulic presses, with either uniform or changeable speed.

Second-Hand Presses.

E. LYON & CO.,

470 B Grand Street, NEW YORK.

Send for circular of what you want.

THE MACKENZIE PATENT CUPOLA & BLOWER.

Send for circular to

Smith & Sayre Mfg. Co.,

PROPRIETORS, 245 Broadway, New York.

This Cupola has made a great revolution in melting iron. It differs from all others in having a continuous tuyere, or in other words, the blast enters the fuel at all points. Above one ton capacity per hour, they are made oval in form. This brings the blast to the center of the furnace with the least resistance and smallest possible amount of power, and in combination with the continuous Tuyere causes complete diffusion of the air throughout the furnace, and uniform temperature, melting ten or fifteen tons an hour with the pressure of blast required to melt two or three tons in an ordinary Cupola. It also enables us to save very largely in time and fuel, the experience of our customers showing a gain of twenty-five to fifty per cent. in time, and frequently to forty per cent. fuel over the ordinary Cupola, and a better quality of casting, especially in light work. It is due to this thorough diffusion of the air and more perfect combustion, extracting less carbon from the iron, making a softer and tougher casting. We manufacture these Cupolas of any desired capacity, numbered from 1 to 25, inclusive, the numbers indicating the melting capacities in tons per hour—No. 1, one ton; No. 2, two tons; No. 3, three tons per hour, and so on up to 25. We have improved the construction of these Cupolas in every way, have increased their strength and durability, and sought to make them as convenient for working and repairs as our own and the experience of our customers could suggest.

NEW OTTO SILENT GAS ENGINE.

Working Without Boiler, Steam, Coal, Ashes or Attendance.

Started Instantly by a Match, it gives Full Power Immediately.

When Stopped, all Expense Censures.

No explosions, no fires nor clinders, no gauges, no pumps, no engineer or other attendant while running. Recommended by insurance companies.

UNSURPASSED IN EVERY RESPECT for heating in warehouses, printing, ventilating, running small shops, &c.

3, 4 and 7 H. P. and upwards. Built by

SCHLEICHER, SCHUMM & CO.,

Engineers and Machinists, 3045 Chestnut Street, Philadelphia.

PUNCHING & SHEARING PRESSES.

DRILL PRESSES.

Power, Foot or Hand Punches, and Shears; all sizes, from \$25 to \$5,000.
Bar-Iron Shears, cut $\frac{1}{2}$ to 3 in.; weight, 275 lbs.; \$75;
New Upright Power Drills, back geared, self feed, quick return motion, swing 22 in., with countershaft, weight 600 lbs., only \$150. Small size, drills up to $\frac{1}{4}$ in. lever feed, swing 13 in., tight and loose pulleys (no countershaft required), \$25.

Peerless Punch and Shear Co.,
115 W Liberty Street, NEW YORK CITY.J. F. ROGERS & CO.,
107 Liberty Street, NEW YORK,
WOOD AND IRON WORKING MACHINERY.

Agents for WHITE'S CELEBRATED WOOD-WORKING MACHINERY, Molding and Planing Machines, Saw Benches, Band, Swing and Scroll Saws. Circulars and price lists furnished.

BAILEY ELEVATOR



AND PORTABLE HOIST.

Warranted double the power and not one-half the price of other hoists. As a proof of the above I will give them 30 days on trial. Send for catalogue and price list. Address,

J. DUNN, 32 Bank Street, CLEVELAND, OHIO.

Machinery, &c.

WILLIAM SELLERS & CO.,
PHILADELPHIA.

Manufacturers of

Iron & Steel Working Machinery,

MACHINISTS' TOOLS,

SHAFTING,

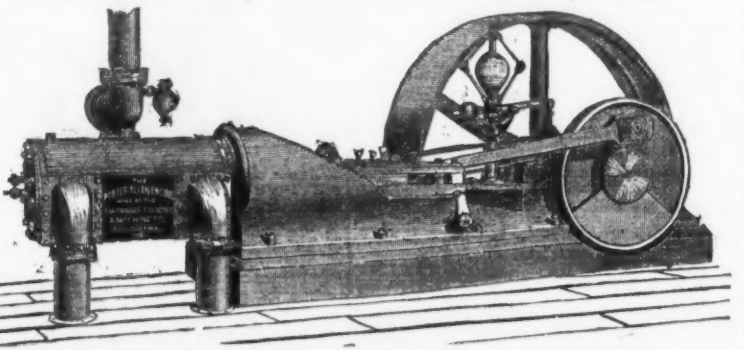
GEARING, &c.,

INJECTORS.

Shearing Machine.

BRANCH OFFICE, 79 Liberty Street, New York.

THE PORTER-ALLEN HIGH-SPEED STEAM ENGINE

W. H. MERRICK, Pres. and Treas.
G. A. BOSTWICK, Secretary.C. T. PORTER, Vice-President.
C. B. RICHARDS, Superintendent.

Belts and gearing dispensed with, for any speed up to 600 revolutions per minute. Especially adapted to Rolling Mill work, Factories and Electric Light Machines.

Having extensive foundry facilities the company are prepared to contract for Iron and Brass Castings.

With largely increased facilities we are prepared to fill all orders for the Porter-Allen High Speed Engine on contract time. Prices and terms of sale for the Porter-Allen High Speed Engine.

Business communications, or reference, must be addressed to the company.

SOLE MAKERS,

THE SOUTHWARK FOUNDRY AND MACHINE CO.,

430 Washington Avenue, Philadelphia.

QUARTZ MILLS & MINING MACHINERY.

W. H. BOWERS, Mechanical Engineer, Salt Lake City, Utah.

General Western Constructing agent for GRIFITH & WEDGE, mfrs. of Mining and Milling Machinery, Zanesville, Ohio, and the BUCKEYE ENGINE CO., mfrs. Buckeye Engine, Salem, Ohio.

Among the many specialties handled by me is the

MINER'S PROSPECTING ENGINE.

Over fifty now in actual use; weight of boiler and engine complete only 450 lbs., will hoist from a vertical shaft 250 lbs.; just the engine you want to prospect a mine 50 to 500 feet in depth.

California Combination Amalgamating Pans, Belding Settlers, Gold and Silver Mortars for both wet and dry crushing, Revolving Roasting and Chloridizing Furnaces; Revolving Dry Kilns, a new feature in mills; Buckeye Automatic Cut-off engines, Pump & Engines, Air Compressors, Rock Drills, Portable Engines and Saw Mills, Corliss Pumps, Steam Pumps, Mining Cars, Blake Crushers, Centennial Mining Cages, with safety catch attached.

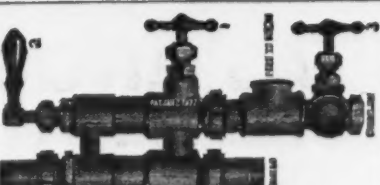
I am prepared to contract for the construction of Quartz Mills and Hoisting Works, in any part of the Pacific Coast.

The houses I represent are the only parties having my plan of Quartz Milling and Mining Machinery, and are the only shops in S. of San Francisco that can build a genuine Quartz Mill, adapted to work all the various kinds of lodes and refractory ores.

Address all communications referring to mill and mining machinery to

W. H. BOWERS,

101 Main St., Salt Lake City, Utah.

SAFE FROM DESTRUCTIVE EXPLOSION.
25000 H.P. IN USE. SEND FOR CATALOGUE.
HARRISON BOILER WORKS PHILA.

GOLD MEDAL, PARIS EXHIBITION, 1878.

THE HANCOCK INSPIRATOR,

New Combined Pump and Injector.

Eclipses all other appliances hitherto introduced for feeding Steam Boilers. A Portable Boiler is not perfect without one. It lifts its water 25 feet with a low steam pressure, and puts it directly into the Boiler. No adjustment necessary for varying steam pressure.

G. W. STORER, General Agent, 149 N. 3d St., Phila.



COOKE & CO.,

(Formerly COOKE & BROS.)

6 Cortlandt Street, New York,

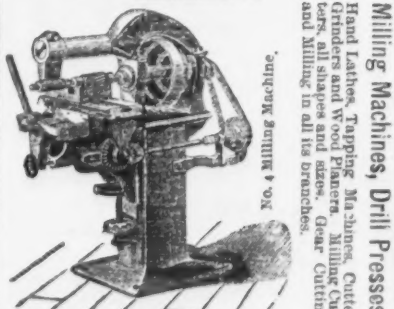
GENERAL MACHINERY & SUPPLIES

for Machinists, Mills, Mines and Manufacturers.

Drawings and specifications furnished and estimates made.

E. E. CARVIN & CO.,

Manufacturers of



139-143 CENTRE STREET,

Cornell's Building, NEW YORK.

Send for Illustrated Catalogue.

THE LA FRANCE FIRE ENGINE CO.

Manufacturers of



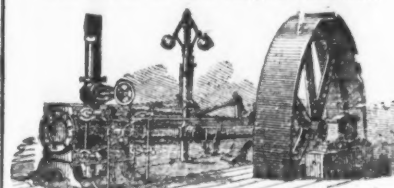
Rotary Steam Fire Engines

ELMIRA, N. Y.

Machinery, &c.

Corliss Engine Builders

With Wetherell's Improvements.



Engineers, Machinists, Iron Founders and Boiler Makers.

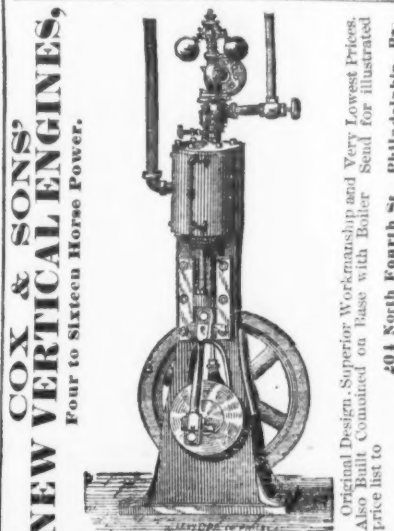
ROBT. WETHERILL & CO. Chester Pa.

CHARLES W. ERVIEN & CO.,

Engine Builders, Boiler Makers and

GENERAL MACHINISTS,

IRELAND STREET, PHILADELPHIA.



Box's Patent Portable Double Screw Hoists, &c., &c.

FIRST PREMIUMS WHEREVER EXHIBITED

Philadelphia, Pa., 1876. - Philadelphia, Pa., 1880.

Box's New Patent Portable Right and Left Screw Hoist.

The latest invented Hoist, with all Box's Patented improvements added. Operates in every particular Positive in action, and double the power of other Hoists. No thrusts; no friction. Single strong lift chain and perfect guides for both hand and air chains. It cannot be bent. Sizes from 100 to 12,000 pounds capacity. BOX'S PATENT PORTABLE DOUBLE-SCREW HOISTS. Always reliable. Sizes 10,000 and 25,000 pounds capacity. BOX'S PATENT PORTABLE LIGHT QUICK HOIST. Simple, durable, cheap. Light. Size 4 and 1000 pounds capacity.

BOX'S PATENT POWER OR HAND ELEVATORS

Sizes from 20,000 pounds capacity.

BOX'S PATENT RADIAL DRILLS, &c. Full descriptive circulars furnished.

Northern Liberties Works.

ALFRED BOX & CO.,

319 & 314 Green Street, Philadelphia, Pa.

Established 1867.

Edwin Harrington & Son

MANUFACTURERS OF

PATENT EXTENSION AND SCREW CUTTING

LATHES,

Iron Planers,

Radial Upright, Suspension Multiple and Lever

DRILLS,

and a variety of other

MACHINISTS' TOOLS

Patent

Double Chain Screw

Pulley Blocks,

unrivalled for durability, safety and power.

Patent Double Chain

Quick-Lift Hoists,

with Brake for quick and easy lowering.

Circulars furnished.

WORKS AND OFFICE

Cor. N. 15th and Federal Aves.

Philadelphia, Pa., U. S. A.

Represented by J. G. MAY

No. 137 East Pearl St., Cincinnati, O.

C. E. KIMBALL, 120 Oliver St., Boston.

COMBINED SHEAR & PUNCH

A Bench Tool made in Two Sizes.

This tool can be secured to a bench. It is a very effective and convenient little tool. Price very low.

No. 1 cuts $\frac{1}{4}$ inch iron; No. 2 cuts $\frac{3}{16}$ to $\frac{1}{2}$ inch iron.

Manufactured by

J. E. HULL,

No. 137 East Pearl St., Cincinnati, O.

Send for circular and Price List.

KATZENSTEIN'S Self-Acting Metal Packing,

For Piston Rods, Valve Stems, &c.

Of every description

For Steam Engines, Locomotives, Pumps, &c., &c.

Adopted and in use by the principal Iron Works and Steamship Companies within the last eight years in this and Foreign countries.

For full particulars and references address

L. KATZENSTEIN & CO.,

35 Desbrosses St., New York.

TUBAL SMELTING WORKS.

760 South Broad Street, PHILADELPHIA.

PAUL S. REEVES,

MANUFACTURER OF

ANTI-FRICTION METALS.CAR & MACHINERY BRASSES, INQOT BRASS
AND SOLDER, WHITE BRASS.
Old Metals and Brass Turnings Wanted.

ESTABLISHED 1842.

WM. & HARVEY ROWLAND,
PHILADELPHIA,P. O. Address:
Frankford, Philad'a.

MANUFACTURERS OF ALL KINDS OF

Elliptic, Platform AND C Springs,"Brewster Side Bar Combination
Patented" Springs.

MADE EXCLUSIVELY FROM

SWEDISH STOCK, OIL-TEMPERED and WARRANTED.

Swedish Tire, Toe, Blister and Spring Steel.

CAST SPRING AND PLOW STEEL.
CAST SHOVEL, HOE AND MACHINERY STEEL.OXFORD TOE, SLEIGH, TIRE AND SPRING STEEL.
BESSEMER SHOVEL AND PLOW STEEL.
BESSEMER MACHINERY AND CULTIVATOR STEEL.RE-ROLLED NORWAY SHAPES.
NORWAY NAIL RODS ROLLED AND SLIT FROM SUPERIOR BRANDS.**STEEL
CASTINGS**FROM 1-4 TO 10,000 LBS. WEIGHT.
True to pattern, sound and solid, superior in strength, toughness and
durability to iron forgings, in any position, or for any service what-
ever. Gearing of all kinds, Shafts, Dies, Hammerheads, Crossheads
for Locomotives, etc. 15,000 Crank Shafts and 10,000 Gear wheels of
steel. CRANK SHAFTS, etc. its superiority over other Steel Cast-
ings. CIRCULARS AND PRICE LISTS FREE.
Address
CHESTER STEEL CASTINGS CO.,
Works, Chester, Pa. 407 Library St., Philadelphia.**IMPROVED STEEL CASTINGS.**

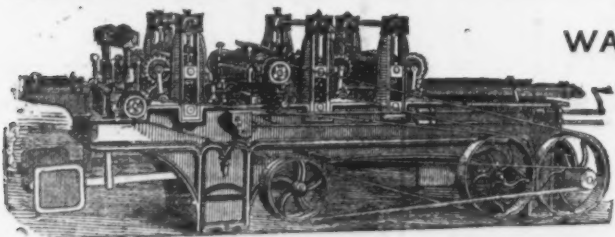
Under Hainsworth's Patents.

We make Castings practically free from blow-holes, of steel which is as soft and as
easily WORKED and WELDED as Wrought Iron, yet is STIFF, STRONG and DURABLE, with a
TENSILE STRENGTH of not less than 65,000 lbs. to the square inch. In short, OUR CAST-
INGS UNITE THE QUALITIES OF STEEL AND WROUGHT IRON.Wheels and Pinions, Dies and Hammer Heads, Engine and Machinery Castings of all
descriptions, Railroad Frogs and Crossings, Plowshares, Moldboards and Landsides.
WE USE NO CAST IRON.

Send for circular.

PITTSBURGH STEEL CASTING CO.,
PITTSBURGH, PA.**PUNCHING PRESSES,
DIES AND OTHER TOOLS**For the Manufacture of all kinds of
Sheet Metal Goods, Drop
Forgings, &c.
STILES & PARKER PRESS CO.,
Middletown, Conn.**IRON PLANER,**

6 x 36 in. x 9 ft. for sale, or will exchange for a larger size.

STILES & PARKER PRESS CO., Middletown, Conn.**Wood-Working Machinery.**

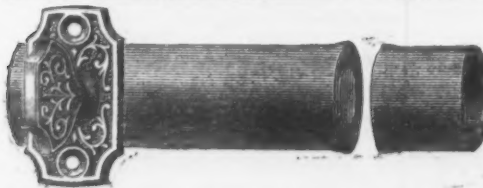
WAREROOMS

172 High Street,
BOSTON.FOR
Railroad Shops Planing Mills, Car Builders, Cabinet,
Carriage, Sash, Door and Blind Makers.

We also deal in all kinds of

MACHINERY AND SUPPLIES.91 Liberty Street,
S. A. WOODS MACHINE COMPANY, NEW YORK.

Illustrated catalogues on application.

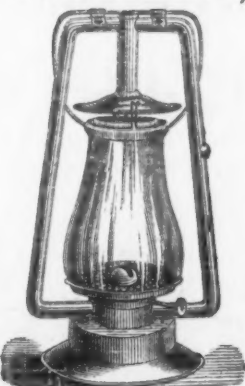
**IVES' PATENT
Burglar-Proof Door Bolts.**
For sale by leading Hardware Jobber
throughout the country.**HOBART B. IVES,**
Sole Manufacturer and Patentee,
187 St. John Street,
NEW HAVEN, CONN., U. S. A.
Send for Illustrated Price List.**Merrill Brothers,**
26 First Street,
BROOKLYN, N. Y.**DROP****HAMMERS,
FORGINGS and
POWER PRESSES.****STANLEY G. FLAGG & CO.**

PHILADELPHIA, PA.

Office and Works,

N. W. cor. 19th St. & Pennsylvania Ave.
Manufacturers of**STEEL CASTINGS.**A Substitute for Steel & Wrought Forgings.
Circulars sent on application.**Steel Castings,**Light and heavy Steel Castings of superior
metal, solid and homogeneous. All work guaran-
teed. Send for circular.**EUREKA CAST STEEL CO.,**
Chester, Pa.
Office: 307 Walnut St., Phila.

THE GENUINE

**No. 0 Tubular
LANTERN,**

With and without Guards.

Is Manufactured by

R. E. DIETZ,

54 & 56 Fulton St., NEW YORK.

We have in stock less than
150 of our well-known Cons
Bearing**"STANDARD
COLUMBIA"
BICYCLES,**In 46 and 48 inch, half bright
and painted, which we offer
at the reduced price of \$75
until they are sold. The
thousands which are in use
have earned a good reputa-
tion. This offer affords an
opportunity to purchase
good, serviceable, new Bicy-
cles at a bargain while the
lot lasts.**THE POPE MFG. CO.,**
597 Washington St., Boston, Mass.New Model, Top Snap, **CHAMPION**
SHOTGUN.
It has a Patent Top Snap Action, by means of
which the gun can be opened by pressing the lever either to
the right or left; an improvement found in no other gun. It
has the **Rebounding Lock**, which ensures safety in
loading beyond a doubt. The other improvements are the
Pistol Grip Stock, and the **Patent Fore-End**
Fastening. By means of the Patent Fore-End Fastening
the barrels can be detached from the stock in an instant, and
quickly replaced. The shells used in this gun are the com-
mon 12, 16, 20, 28, 32, 40, 48, 56, 64, 72, 80, 88, 96, 104, 112, 120,
128, 136, 144, 152, 160, 168, 176, 184, 192, 200, 208, 216,
224, 232, 240, 248, 256, 264, 272, 280, 288, 296, 304, 312,
320, 328, 336, 344, 352, 360, 368, 376, 384, 392, 400,
408, 416, 424, 432, 440, 448, 456, 464, 472, 480, 488,
496, 504, 512, 520, 528, 536, 544, 552, 560, 568, 576,
584, 592, 600, 608, 616, 624, 632, 640, 648, 656, 664,
672, 680, 688, 696, 704, 712, 720, 728, 736, 744, 752,
760, 768, 776, 784, 792, 800, 808, 816, 824, 832, 840,
848, 856, 864, 872, 880, 888, 896, 904, 912, 920, 928,
936, 944, 952, 960, 968, 976, 984, 992, 1000.
JOHN F. LOVELL & SONS, Gun Dealers, Boston, Mass.
Send stamp for Illustrated Catalogue.BUFFALO BLACKSMITH'S BLOWERS
& PORTABLE FORGES
FOR SALE BY ALL DEALERS
BUFFALO FORGE CO. MFRS
BUFFALO, N. Y.
SEND FOR CIRCULAR & PRICE LIST

Light Soft Gray Iron

CASTINGS

METAL PATTERN MAKING.

The Elwell Hardware Co.,
P. O. Box 1914, Bridgeport, Conn.**THE GREATEST
ROCK BREAKER ON EARTH**And we guarantee it to do double the work of
any upright convergent jaw crusher. And we
challenge any manufacturer to a trial any time in
Chicago. Send for Circulars.**GATES & SCOVILLE IRON WORKS,**
53 Canal Street, Chicago, Ill.**TACKLE BLOCKS.**Rope and Iron Strap of all kinds. Lig-
numvitae Wood for Ten-Pin Balls.**Wm. H. McMillan & Bro.,**
Office, 113 South Street, New York.

Factory, 39 to 40 Penn St., Brooklyn, E. D.

Send for new Illustrated Catalogue

CLAYTON AIR COMPRESSORS

With Price List, issued Sept. 1, 1881.

CLAYTON STEAM PUMP WORKS,
14 & 16 Water St., Brooklyn, N. Y.**Scranton Brass Works,****J. M. EVERHART,**

Manufacturer of

BRASS WORK,For Water, Gas & Steam. Also
Carr & Wilcox's Patent Cut Files.
Will cut faster, wear longer, and clog
less than any file in the market.

ONE Street, SCRANTON, PA.

RUSSELL, BURDSALL & WARD,

PORTCHESTER, N. Y.,

MANUFACTURERS OF

CARRIAGE, TIRE, PLOW, STOVE & OTHER BOLTS.

Carriage Bolts made from Best Square Iron a Specialty.

JOHN RUSSELL CUTLERY CO.,

Green River Works,

MANUFACTURERS OF

Table and Pocket Cutlery,

BUTCHERS', HUNTERS', PAINTERS', DRUGGISTS' & HOUSEHOLD KNIVES

IN ALL STYLES AND VARIETIES.

OLDEST AND LARGEST AMERICAN MANUFACTURERS.

New York Office,

25 Chambers Street.



Factories,

Turners Falls, Mass.

F. W. WURSTER,

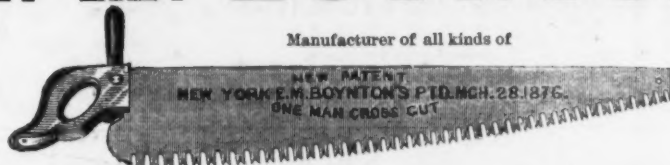
**IRON FOUNDRY
AND AXLE WORKS,**130 to 149 First St.,
Brooklyn, N. Y.**AXLES**SUPERIOR
WAGON, CART AND
TRUCK AXLES.Our facilities enable us to quote the
trade lower prices than any other
manufactory. Send for price list.**J. M. CARPENTER**

PAWTUCKET, R. I.

MANUFACTURER OF TAPS AND DIES.

E. M. BOYNTON,

Manufacturer of all kinds of

**First-Class Saws, Frames, Cross-Cut Handles,
TOOLS, FILES, &c.**

Also sole Proprietor and Manufacturer of the

GENUINE PATENT LIGHTNING SAW

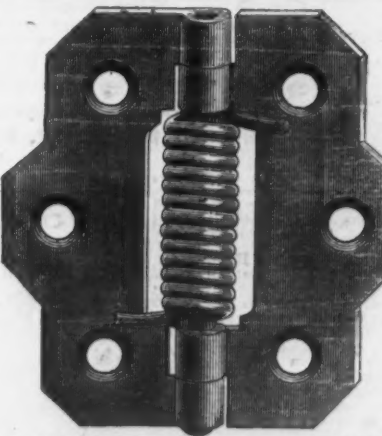
80 Beekman Street, NEW YORK.

I have during the year added to my extensive facilities the construction of a new Saw Manufactory
100 feet by 90 feet, comprising 36, 38, 40 and 42 Devco street. I have purchased costly land and erected
an additional four-story brick manufactory, in order to fill special orders for my rapidly increasing busi-
ness. The new addition comprises about 20,000 feet of floor space, fitted with the latest improvements
in automatic machinery for saw manufacturing. For grinding circular saws I have a new machine,
admitted to be unsurpassed in accuracy and speed. I have also three horizontal machines for grinding
cross-cuts, mill saws, hand saws, buck-saws, &c., with capacity for over 1000 saws per day.
I have added extensive File Works, but shall make only best hand-cut Files, as in filing saws I find
them the cheapest at the higher cost. I can fill special orders, and shall expect at all times to have on
hand, at my store, 80 Beekman Street, New York, a few thousand dozen each Hand Saws,
Cross-cuts and Files, Saw Sets, Patent Handles, &c.**ACME SPRING HINGES**

For Screen Doors,

WROUGHT OR MALLEABLE IRON,

Walnut Bronzed,

WITH BRASS SPRINGS.PRICES
VERY
LOW.SEND
FOR
LIST.**VAN WAGONER & WILLIAMS,**

MANUFACTURERS OF

Am. and Gem Spring Butts, Gem, Star, Torrey and Bee Door Springs,
Domestic Blind Adjusters, and other Hardware,
82 Beekman Street, NEW YORK.**BALTIMORE RIVET AND SPIKE WORKS.**Rivets,
Spikes,
Bolts,
Nuts,Washers,
Bolt Ends,
Wood Screws,
Track Bolts.**WM. GILMOR of WM., cor. President & Fawn Sts.**